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OUR

HEREDITY FROM GOD

CONSISTING OF LECTURES ON EVOLUTION

BY

E. P. POWELL

NEW YORK
D. APPLETON AND COMPANY
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1887

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This book is dedicated to all those who, like the author, have lost faith in authoritative Revelation, in hopes that they, like himself, may find satisfaction in that revelation of Eternal Life and Truth which is steadily unfolded to us by Science.

But in giving it to the general public, I wish it to carry my expression of most affectionate regard for Merritt Peckham, and the other members and friends of my Utica Society, for their very great encouragement and kindness during the delivery of my lectures.

PREFACE.

These lectures are printed in part as delivered to my society in Utica, while others are several lectures compressed or epitomized.

My object in publishing is not unlike that which led me at the first to write for my auditors. I desire to make evolution coherent to the average reader, and relieve him of vague as well as often erroneous views of what it is and what it involves. I desire to be of some use to those who are escaping from the thralldom of supernaturalism and the autocracy of mythology. Earnest and honest men can not too soon comprehend that our only salvation is in that evolution which has led from the primordial cell to Jesus and Plato, and has lifted life from the hunger for protoplasm to the hunger for righteousness. No religion but that of evolution can end anywhere but where it begins, in a chaos of creative purposes thwarted and disrupted, and in an eternal struggle to amend a shattered divine plan. The recent words of a learned bishop express probably the average accepted impression: "The world was fitted up for man's occupancy, with adequate means, inherent or *supplemented,* to meet all his needs." I shall be seriously disappointed if I do not assist in defining the positive and aggressive tendencies of evolution as a science and a philosophy. Nothing is less true of scientific thought at the present time than the supposition that it is resting in either materialism or agnosticism.

In some respects Parts I and II are intended only as introductory to Part III. Human evolution, in its manifold relations, is based on the antecedent advance of structural forms and functions. These, leading ever onward and upward, bring us to the threshold of that more magnificent but still progressive unfolding of intelligence and moral purpose manifested in human history. There is one—and that the simplest—explanation of the universe, which, while showing sustained progress in the past, pledges eternal betterment in the future. This is the gospel of hope for all those who choose to go forward with the supreme moral purpose; it is the gospel of degeneration to every one who, declining obedience to the laws of ethical living, contents himself with animal functioning.

May I add, not offensively, that this book is a result of the most earnest and, at first, painful struggles to find deliverance from the chaos left by the wreck of supernaturalism in my own mind. Born and nurtured in Calvinism, I had reached its natural outcome in a shocked sensibility, in the face of its dire failure to explain the universe, to apologize for God, or to save mankind. Its bibliolatry at last gave way, and, with a sense of dire necessity, I set to work to know where light might be. Taking up the study, first, of the history of religion and general anthropology, I passed to Darwinism and to general evolution. I had no other thought but to listen, and to heed the truth when found. The vestibule of this study—perhaps of all study—is apparently agnostic, and doubtfully materialistic, but I rest peacefully in the conviction that the end is the embrace of God.

I have used the word God, as well as other words, charged with extra-naturalism, although it would be better if their use could be supplanted. However, it will not be misleading to those who are careful readers. Such words bear in them such a vast amount of historic sentiment that they can not be lightly laid aside.

I owe inspiration and help to many authors and friends, but, above all, to the works of Prof. E. D. Cope and those of Edmund Montgomery, two men whose careful and masterly thought has done much to clear the way to an orderly philosophy of evolution. I only wish that I had become familiar with their writings much sooner, and might thus have gained more of their pure spirit of investigation and power of generalization. Prof. Cope's recent book, entitled "Origin of the Fittest," I recommend as one of the finest products of American intellect.

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OUR HEREDITY FROM GOD.

PART FIRST.

LECTURE I.

THE PROBLEM STATED.

THE investigations of Nature during the last half century have not only shaken the belief of the reading public in the theological explanation of the world and life and man and history, but have placed preachers of current theology in a situation of peculiar embarrassment. We find our old views, based on the theory of an Adam created by a personal extra-natural Deity, confronted by an antagonistic theory that professes to account for the world, for all living forms, and for man himself, by natural life-evolution. By this new hypothesis, not only are all structural forms explained without appeal to any author of Nature or Being apart from Nature, but it also affirms religion, morals, ethical systems, and social organisms to be natural developments; and all progress of a psychical sort to be only a continuous widening of the relations of the mind to the universe.

The two theories can not compromise, as they can not harmonize. It is waste of time to try to compel them to do so. On the contrary, they sharply antagonize. One asserts the universe of matter, involving mind, to have been created from nothing by a pre-existing Deity, and that out of that created something he shaped all appearances, whether organic or inorganic—at least as far as species. By the other theory a vital and moral force has eternally constituted a substantial universe, uncreatable and indestructible; working continuous progressive change—man being, so far as our vision goes, its final and highest product. The older theory accounts for the universe, for life, for species, for religion, for the Bible, on supernatural grounds; the later theory bluntly affirms that it can account for all things as purely natural processes. The older theory premises a God as originally existing, and nothing else. By his personal will all things have come into existence. By his special providence many things have been adjusted. By his special inspiration man has a theology and religion of salvation. Evolution refuses to accede to this, but assumes that whatever is, always was and always will be; and that, from universe to man, all appearances are but phases of eternal and every way modifiable substance, energy, and sentience. Religion, by the same authority, is a result of mind adjusted and re-adjusted to widening environments of knowledge; beginning, as the outlook of a primitive creature, with meager powers of investigation and generalization, and growing broader, deeper, and more rational as the mind rose to an apprehension of cosmical surroundings, and at last grasped the conception infinite.

This is the antagonism, direct and aggressive, which has grown up between theology and science. It remains now to see whether evolution, beside giving us a more rational explanation of the universe, can, as a philosophy, give us also a richer and more satisfying faith—a faith that is constructive of individual character and social order. In these lectures I shall, while attempting no compromise, keep ever in view the necessity of a philosophy that shall ultimate not only in a logic of things, but in the higher logic of right living.

No minister can honestly ignore the conflict. The time has come when we must either overcome evolution or submit to it. We must comprehend it and disprove it, or readjust our views to its demands. We may premise, in approaching the study, that it would take at least the seal of absolute inspiration to confirm, without question, a theory of the universe and of man framed by remote antiquity, before even the discovery of the revolution of the earth about the sun. Whatever else we have received from primitive ages falls into the class of puerilities or of myths.

I shall now undertake to state the problem of evolution clearly and succinctly, and in language free from technicalities. There is nothing more amazing to the adult mind, as there is nothing more puzzling to a child, than the vast number of varieties of plants and animals which we meet in even a casual study of Nature. Not only is the ordinary observer overwhelmed with the constant occurrence of new creatures, but the scientist finds it impossible to reduce to order and classification the amazing fecundity of living forms. Of plants, half a million of species are already enrolled, and the number grows even more rapidly than ever before. Of animals, two millions are classified, and we are evidently nowhere near an end.

But in all this infinitude of forms there is a recognized relationship. A turtle may not look much like his saurian cousins, yet their kinship is unquestioned. So also he has as a vertebrate an honest classification with creatures otherwise much more exalted. The horse and the antelope and the bear, and all the higher carnivora and herbivora and the omnivorous apes of the Tertiary period, are traceable to a common ancestor. So it comes about that every living thing finds its place and rank in a series of orders, species, families, etc.

Another fact we soon fall upon, and that is that no two individuals of any sort are exactly alike, but in their close relationship still vary from each other. This variation involves a tendency that is always operative—a tendency that applies not only to individuals, but to groups of individuals —for any group established with general likeness still tends to vary in relation to other groups. In our barn-yards new breeds of horses appear. The Jersey cow gets fixed as a structural form with specific color and milking qualities. This variation man assumes to control, and largely does control, creating to suit his purposes animals or plants at will. If he wants speed, he breeds for that end; if flesh, he selects in that direction; if intelligence, it is not beyond his power to secure it.

The processes pursued you understand; while the sum of the laws that he must obey is this, that any living form, whether plant or animal, follows an established heredity modified by environments. Heredity itself brings certain fixed tendencies of variation in itself to follow an established route. So we must say that the circumstances or environments, which may be placed about and brought into a range of influence upon growth at any stage, must co-operate with a determined drift in the creature itself to follow an established line of development, involving fixed and established breaks, leaps, or irregularities. All descendants, under precisely similar conditions, would be exactly alike, only that heredity itself brings in it either instability or established tendencies to vary. But, as conditions, within and without, infinitely vary, no two of any progeny are exactly alike.

We shall have occasion before we finish these lectures to consider more fully what heredity is, and shall find it to be an achievement of purpose. It is elemental "chaos" working upward into definite order on the line of aim and intent. Life never appears except as purposive and possessed of tendency; so it is that heredity is in reality the power of an idea to control environments; while the power of environments is shown in modifying the idea. Under these natural laws and conditions we work as physical and moral agents. The farmer says I must secure the right environments, and my horses or cows, already possessed of a definable heredity, can be made to vary largely according to my desires. That is, he supplements the purpose in heredity with his own purpose and determinativeness. In my vineyard I know how to so cross a hardy Concord with a luscious but tender Hamburg as to secure a progeny involving in different degrees the qualities of both parents. My Ayrshire cow is still a cow notwithstanding her long line of ancestry bred on the Scotch hills; but she brings her modified tendencies as a cow, having lived for generations by climbing for food, and getting it by hook and by crook; for now she is still a climber and will be a climber for generations after it is needful. She will walk up-stairs to a hay-mow, get her forefeet up a leaning apple-tree; and will get a good living, keep fat, and furnish abundance of milk where another breed would starve. But those horns of hers have been well educated to wild life and the defense of her scanty bits of herbage, and they are very dangerous and will be used in a reckless way these many generations. So it is that born instinct and function vary and become established as variations. And I, if I comprehend this, will breed my Ayrshires with cattle educated and framed elsewhere; and, though I may lose somewhat of hardiness and intelligence and thrift, I will gain in the way of good manners.

But Nature never fails to remind us that heredity is only a slowly established tendency, and that permutation is the original tendency in nature; for, if you succeed in breaking up an established order or species, you will find the most persistent effort necessary to prevent unlimited variation. Mutability can be overcome only as mind is brought to bear either within or upon an organism. The difficulty is not so much to secure a new variety or a new species as it is to establish and confirm it. Five years ago I had in my garden five varieties of beans. They were old-established sorts that seemed ready to reproduce their own kinds. I cross-bred them, however, and now have from the original five varieties over three hundred varieties, differing in color, form, growth, and other characteristics. But I can not stop the variation. The tendencies that were fixed are now broken up, and the tendency to vary is established. Those which show excellencies worth preserving can not be kept as they are, without great difficulty. You may even expect some astonishing leaps and freaks, or reversions to old ancestry, in any such experiment.

But heredity once established becomes a law—an inherent determinative force; it is plant-will or elemental will. This, however subject to environments of a new order, retains a large share of its grip. Wheat remains wheat whether carried to a warm or a cold climate; but in one place it is spring wheat, in another it becomes winter wheat. Your Northern Spy, best in New York during March or April, if grown in Missouri is a Fall apple. A peach is still a peach, grown on sandy or on clay soil, but you soon discover that the soil very decidedly affects the size and the quality of your fruit. You are, however, puzzled, when you come to classify your fruits, to find that peaches, pears, apples, plums, apricots, and even blackberries and strawberries, are all members of the same general family. Did they come from one stock originally? The believer in the production of all forms by evolution answers that they did. His opponent refuses to allow that variation can go beyond the line of species. This objection to variation has lost its force, but in a general statement of the question it needs consideration. Nothing is more certain than that the force that lies in heredity itself drives across specific lines, giving us out of one stock or genus several absolute species. The almond, peach, and nectarine, all species well defined, are purely breaks or "sports" of one ancestor. Hybridization accomplishes results of the same sort. That is a propulsion within, a force involved in heredity, or a purposive influence from without, can break through the dividing walls between species. All acknowledged authorities confess species to be but an imaginary line, indicating extremes of variation between groups that vary less within their own limits. Varieties indicate weak life currents; species, strong life currents. Drift in nature is not easily overcome. What we mean by species is only a strong tendency in a group in a certain direction, and accumulation of life power to do and be a certain thing. It is not easy to overcome this; and if overcome, the tendency is to sterility of the issue. The parents do not harmoniously blend in aim and purpose. But the known cases of fertile hybrids show that there is no law in this direction that can not be overcome. Sterility depends not on specific differences, but on larger facts, such as constitutional dissimilarity, which is the sum of all multifold causes involved in the process of integrating. It is even quite difficult to cross certain varieties within a species. To make the point clear by a familiar illustration: in my experiments with beans it is far more difficult to secure a cross of the Lima with other common beans than to secure a cross in other directions, simply because the Lima is highly specialized, and its heredity has secured a greater degree of inflexibility. The domestic cattle of Europe are the fertile progeny of three well-defined species belonging to the Diluvial era. These species have perished into one that survives. The truth seems to be that specific types tend to vary precisely as other types vary, only in less degree.

Evolution is the hypothesis that asserts that we have in these laws of descent and variation a complete explanation of all that has occurred since "the beginning" of life. We may reduce the general hypothesis to the following formal terms: 1. Life began on our globe as a simple protoplasmic cell, or the simpler antecedent of such a cell, from which, in long periods of time, to us practically infinite, have been evolved all organic and functional changes. 2. Each individual and each group of plants or animals inherits a modifiable tendency and character. 3. The variations in any plant or animal may become fixed and capable of being inherited, thus giving rise to varieties, and, in time, to species. 4. The destruction of many varieties and the survival of some, is determined in general terms as the survival of the fittest, which does not mean the survival of the best, either physically or morally, but of those best fitted to protect themselves in the struggle for existence. 5. The struggle for existence goes on at all times and everywhere as an essential process of natural forces involving desires to be gratified. Hunger lies at the bottom of all living, and underlies all structural changes. 6. Through all changes and all generations one unceasing purpose runs—a purpose to progress from the simple to the complex, from the physical to the ethical, and so it is that the monad climbs to man by the power of sentient will.

Evolution thus gives us, in the place of an extra-natural Creator, a power in Nature itself to solve the puzzle which met us at the outset—namely, an enormous multiplicity of varieties and species of animals and plants, all correlated and classifiable in groups and kingdoms of groups, the kingdoms themselves being interactive and co-operative. Linnæus said, "There are as many different species as there were different forms created in the beginning by the Infinite Being." The evolutionist answers, Species cross as varieties vary, only with more bias to overcome, and they do so by determinable methods, all of which lie within Nature. Darwin only went so far as to say, "There is grandeur in this view of life, with its several powers originally breathed by the Creator into a few forms or one; while from so simple a beginning endless forms, most beautiful and most wonderful, have been and are being evolved." Mr. Darwin, in such a passage, considers the processes of life, and not its origin, which he presupposes to be the fiat of a creator. Evolutionists of this day will, however, not allow that even the cell or protoplasmic life-stuff was created. Darwin gave up the idea of a Being, outside of and apart from Nature, needed to interpose at specific points in natural evolution to supplement with supernatural power. It is now asserted by his school, and all who accept the present positions of scientific speculation, that the hypothesis of a creator at all is wholly unnecessary and untenable. It is the object of my lectures to follow the lead of evolution, and see if it can make good both premise and conclusion, and to discover what physical and moral results are involved in so sweeping a revolution in our conception of Nature.

So far as man is concerned, there are practically no evolutionists left who do not affirm that he also is in the line of natural descent, and a product of the same sort as all other living forms. The primordial cell, having passed through all the lower stages of vegetable and animal life, has culminated in the animal that reasons, is possessed of self-consciousness, and that hopes for immortality. The immediate progenitor of man is presumed to have been of the ape or lemur stock, closely related to, but not identical with any existing species. That is, man and the apes are from a common ancestor. But it is an extremely narrow conception of evolution to think of it, as I fear most at present do, as simply teaching the descent of man from animals. It is at least that thread by which we feel our way back to the simplest organic creature, and then forward again by the same thread, tracing the cell through its simpler changes, and, in turn, its more complex, until the world is wealthy with myriad forms of life. A glorious march it is thrôugh munificent mazes of beauty and grace and power, until, having coursed the realm of plants, trees, and flowers, as well as the more princely realm that stretches from the sponge to the vertebrates, we at last find ourselves among the mammalia or milk-givers; at the head of these the few primates; among the primates man as king; and among men, reaching well upward, by aspiration and inspiration toward the Infinite, Jesus, Plato, Shakespeare. Instead of saying man is descended from the ape, we should rather conceive the ape as a development of an arrested sort from the ancestor of both man and ape. And I intend to do more than this, to show you, before the close of my lectures, that a complete view of evolution carries us back altogether of all phenomena of life, to find our true origin in the womb of Infinite Life itself.

Under the forces of evolution, the one conservative and tenacious of the old, the other radical and eager for the new, I think it is possible to account for the superb life, beauty, and progressive tendencies of our world. A stout persistence of the old is constantly wrestled by an aggressive desire for the new. And it will be quite in my line to show you that moral and intellectual development follow the same law as structural; in other words, higher morals, like finer beauty, come from favorable environments antagonizing unfavorable hereditary tendencies. If you wish to make a Cornish miner into an intellectual citizen, you must remove him from depressing associations and toil. If you wish to lift the tenement-dwellers of our large cities in the scale of pure living, you must first provide them with better homes. History shows us races dropped into barbarism and ultimate extinction through the changes wrought by war, by subjection to tyranny, or by transfer to inhospitable climes. The struggle for existence ends in the survival of the fittest, but the fittest morally are the most moral and industrious; so it is that character reacts on environment as environment acts on character. Evolution is compelled to consider not only progressive change, but dégeneration and lapse.

I shall now leave the two hypotheses as they stand, face to face, fully antagonistic and unreconcilable. The exact definition of the theory of a creation is the direct exercise of the will of a Being, extra-natural, originating at successive periods the organisms that have peopled the earth. The careful definition of evolution is the descent of species from species, by insensibly fine gradations, during vast ages.

I have used, or shall use, the words cell and protoplasm, and primordial cell. The cell is simply an inclosing wall of matter of the simplest sort, in which is a fluid particle. The primordial cell is that cell which by supposition was first to exist. Protoplasm is life-stuff, or that composition of matter which is necessary as a matrix for life. So far as our globe is concerned, life never appears except in conjunction with protoplasm, or bioplasm, which is all the same thing. It is composed of definite proportions of four substances found as elements in nature—carbon, oxygen, nitrogen, and hydrogen. Wherever this compound exists life may exist. That is, added one more element, non-material, and life does and must exist. This complex substance vegetable growth originates. Animals must receive it almost wholly from the vegetable kingdom. It is not necessary to consider that life did not exist before the cell, or even apart from protoplasm; it is only necessary to understand that as we see it manifested, it is only under such conditions. We must also bear in mind that the spectroscope has recently revealed to us that the elements that compose life-stuff are common materials of the whole universe, existing in all worlds.

It may be well also, in a preliminary view, to remember that as evolution posits of man not a fall but an ascent from simple social conditions to complex ethical relations, so it points to an endless progression ahead. It shows us not as a completed work, but leaves us on the road. It speaks of the past as without a beginning, of the future as without an end. It promises as grandly as it reveals. You will find there is no question of life, or of thought, of religion, history, philosophy, of social science or politics, that does not seek its solution in evolution. The struggle for existence still goes on, but it is more than ever a struggle of ideas and purposes. The law of evolution is not a divine fiat or series of fiats; it is the orderly sequence of a causative principle that lies in nature and in all nature.

Taking the motto of Kant, that "Man can not think highly enough of man," I can much more readily feel pride in my ancestry when I see them, by the power in their brain-cells and their hands, forcing their way upward through the most antagonistic conditions, until, from a primitive anthropoid, they reach the dignity of the Caucasian masters of nature and rulers of the world, than I could if I saw them fallen from a godlike origin, hating their creator, and by him cast off as recreant rebels. If any one can take pride in a race totally depraved and lapsed, and fit only for eternal punishment, I can not comprehend him. Evolution is the theology of rising humanity, of honor, of faith, of hope. Creation is the theology of a great despair, ringing through all time, a terrible failure with but slight compensation, involving a religion nihilistic at the core.

LECTURE II.

THE UNITY OF NATURE.

EXCEPT for theological purposes, we never think or speak of Nature except as one—the universe, an absolute unit. True, we can not reach its confines, but we have learned to believe and to try to think of it as boundless. Early efforts to comprehend natural phenomena ended naturally in very partial and fragmentary views. The sense of unity that we embody in the words eternal, infinite, universal, the cosmos, was no more possible to primitive man than to the savage. His were perceptions, not conceptions, for the most part. His sky was a roof; his world an island or a boat set upon an elephant or a fish. Partialism slowly, by accumulation of facts, became universalism. The many dropped into the one. The discovery of the heliocentric plan of the universe, the planetary laws of motion, the universality of gravitation, caught up men's minds to a conception so grand, so severely simple, that we are unable to do more than bow to its verity.

As fast as universalism grew to be a conception, polytheism grew feeble, for the gods were only the forces behind events, imagined to act as causes. Men must find a final cause, a cause of causes. There must be a God of gods, an infinite Creator. Monotheism was a natural growth. This must ultimate in the unity of mankind; for if one God, then his work must be one; if a Heavenly Father, then are we not all his children? So, as a natural evolution, came about the superb unity of Nature, as conceived by theology, over which one great Being presides to work out his will.

The revolt of the present day is on the same line of unification. For so far we have, in popular theology, and possibly in a sort of theological philosophy, a vast system of interrelated forces filling all space, in which system appear all the phenomena of worlds and their inhabitants; but, besides this, an extra-natural, super-universal being, who is the cause of causes, the origin of the universe, and at whose will it was and is. Says Prof. Diman, we believe in a God "apart from Nature," the "final cause" of order and law, as well as of substance. Or, if there be a tacit allowance that the substantial universe was not created from nothing, still its cause, in the sense of Creative Ruler, is not within Nature, but wholly above and apart.

This limitation to the view of absolute unity not only establishes a universe and something else, but it requires an explanation of the defects in the system of Nature. For your absolute final cause can not be conceived as lacking in power or in good-will; otherwise there is power and will that is not traceable to the cause of causes, and there must be another cause. Practically, all the universal religions have been unable to escape the dilemma, and have fallen into dualism. Early Aryan religion, as developed in Persia, bluntly said there are two supreme gods contending for mastery, Ormusd and Ahriman—the good and the evil. One of these plans righteousness and order; the other plots to subvent him and destroy. Christianity refuses to accept this view, yet covertly it introduces Ahriman (the same word corrupted into Sathan or Satan), but makes him a subject in rebellion. Our theology is therefore compelled to work on the basis of a universal physical nature, in which appear all intelligent phenomena as the result of the will of an extra-natural being, whose will and work are interfered with and largely subverted by an inferior being, or devil.

Either this must be held, or we fall upon the other horn of the dilemma, that God of his own intent created evil, and decreed vice and misery. It does not matter, for no subterfuge of speech can lift the responsibility of a creation from the shoulders of an absolute creator.

Stopping for one moment to survey the universe under the above supposition, as a creation, let us apply to it the laws of common sense—by common sense I mean the rapidly increasing power of the average mind to examine facts and generalize truths. 1. Is it probable that a creator of unlimited power would have created in such a way that not one of his creatures for one moment should be safe from the destructive instincts of some other ? In other words, would a good being have created a system of universal ravening, where only one out of a million could survive, even briefly, and that one at last fall before natural death ? 2. Would he have created so large a number, and in no case a single structure without defect ? As it is, the best organic contrivances of which we are cognizant lack in perfect fitness to ends sought to be accomplished. The eye as an optical instrument includes mechanical defects. 3. Would an absolute creator have left his highest work subject to moral as well as physical ruin ; wars and lust adding horror to cataclysms and depressing environments, both natural and artificial ? 4. Is it possible that an all-wise creator would have made man so like an ape that a structural and intellectual kinship is not only determinable by science, but is palpable to the superficial observer ? Is almighty wisdom so limited in his types and concepts that he must make his children after the likeness of beasts ? 5. Nature has been able, by its contained causality, without aid from without, to bring forth in good shapeliness Shakespeare, Plato, Gladstone, Cuvier ; is it possible that it could not have produced also Adam ?

Evolution constitutes a revolt against a conception of the universe that is not an absolute unity. It does not consider as possible anything not immanent in the universe itself. That there are evolutionists who hold that the universe is not only all, but is purely a mechanical interplay of forces, is possible ; but it is not true of the leading thinkers of the world and the ablest workers that the hypothesis of evolution is to them materialistic in its tendency, or agnostic, or atheistic. The result of evolution is purely to establish an absolute universe ; to put an end to the conception of final forces above and beyond the universe, needed, either continuously or at special seasons, to sustain the universe or amend its processes. It certainly allows vast space for the miraculous, if thereby you mean the wonderful and unexpected ; but the miraculous as a break in unity, an interruption of natural law, an amendment to the order of the universe, it aims to demonstrate as, at least, quite superfluous and unnecessary.

Evolution is not responsible for this tendency to unify, but only for its effort to complete the unity. There has been for generations a continuous process of pushing back the first cause farther into the realm of the unfathomable. Prof. Diman and others even formulate it as a duty thus to "push back as far as possible" the extra-natural being to whom we owe all that is. Does the question not easily suggest itself, if this pushing has so long gone on, may it not continuously go on forever ? Or what if, by one final push, we dispense with final cause forever ? Trace the process, and its consequences, as it has gone on, and let us see if, after all, it has so far resulted in gain or in loss.

Long before the evolution hypothesis was formulated, it was conceded that the world, and all other worlds, came into plan and shape from one motion in primal matter. The telescope and mathematics combined to demonstrate the interaction of all globes. Common physical principles were found to permeate the whole. Gravity not only clasped all the constellations, but all atoms. Not a grain of dust on the tiniest earth escaped this ligature of law. Jupiter, in the mazy rhythmic dance of globes, held fast to the earth. Nay, even my hand has an appreciable power on Jupiter, as Jupiter has an attractive force on my hand. So inter-linked in action, in destiny, in purpose, was the visible universe.

Then came the spectroscope, and shortly it informed us that not only did all matter gravitate with all matter, but that all globes contained the same constructive elements; that the sun and the moon and the stars, yes, even the meteors, the comets, the nebulæ, were composed of oxygen, hydrogen, salt, iron, gold, and the other substances that make up our globe. What, then, but that our world is a piece, a fragment, a part of one grand whole. It is not alone, unlike, dissevered elementally, but is associated with all the rest of Nature. The universe is a single home. Sun, moon, planets, the distant stellar clusters, and the still unformed star-dust, all, all possess a physical unity.

This grand idea was made more perfect by the discovery that light and radiant heat are modes of motion; that light leaps to us from suns and stars by a propulsion of wavelets through a universal ether. So the fact became apparent that the globes and clusters of globes not only attract each other, but touch each other; that the whole vast universe touches in all its parts. As literally as the ocean ebbs in unity, or the air throbs in unity, so the universe pulses with tactual oneness—shall we not say with one thought, one purpose, one life?

It is the good fortune of every school-boy to know what the La Place theory is. Yet it is only a matter of fifty years since theology declared this theory atheistic. But steadily the Mosaic account gave way before it. The six days became six vast periods. Evolution only desires to push still farther back this myth, or rather to dispose of it altogether. Not only can the origin of worlds be better accounted for as a result of inherent laws, but all things on the worlds—life, the changes of life-forms, man, and man's progress.

Botany takes us into the fields, and demonstrates that a tree is only millions of cells elaborated into trunk, root, branch, flower, leaf, and fruit; indeed, it shows us that all these millions originate in one simple cell and its vital function. That single cell, by division and subdivision under the power of a persistent selfhood, climbs upward and plows downward, moment by moment, year by year, until the elm or pine stands complete as it is beautiful.

Animal life is graded all the way from the protozoa to man. It is not evolution, but biology, that arranges all living creatures in ascending grade. 1. Animals that consist of only a cell, or cells, without blood or nerves. 2. Hollow animals, differing hardly from the first, only that they are not solid, but have a rudimentary digestion. 3. Creatures with independent digestion and a circulation, with a skin and a beginning of nerves. 4. Creatures more highly organized with knots of nerves. 5. Creatures with an alimentary canal, and more complexity otherwise. 6. Creatures with high nerve organization, and digestive apparatus. 7. Vertebrates, or backboned animals with internal skeletons. Then, beginning with the lowest vertebrate, we find a close and accurate gradation, by the way of the lancelet, the lamprey, the shark, the frog, the reptiles, the birds, the mammals, ending in man. But what matters it where we turn, every section of life displays the same unity. Is this not evolution apparently? Is not the burden of proof on those who assume that this is really no unity at all, but that a maker so arranged the things he made that one is more complex than the other?

Man not only fits into the series with precision, but he is built up on the same principles as the tree or the animal. Psychically or mentally, he follows the same law. As cell propagates cell, so thought evolves thought, till the soul is built up with the body.

This glorious picture of the Unity of Nature is not complete until we view it in another light—the light of the past. For through all Nature, in all preceding ages, ran a prophecy of man. Agassiz, although persistently opposed to the evolution theories of Darwin, yet says, "Man is the purpose toward which the whole animal creation tends from the appearance of the first paleozoic fish." Goethe, picking up a skull in a cemetery, in a moment of inspiration cried out, "This skull is only a modified vertebra." That is, the first vertebrate creature, by slow changes at the upper end of the column, developed a brain-case. Richard Owen said, "From the beginning of organisms man was ideally present on the earth." These men, the closest observers and ablest generalizers, recognized the Unity of Nature—the oneness of the plan which embraces all life and living organisms. Man not only involves all the past, but all the past implied man. Long before Darwin, this prophetic forward look of Nature, from the slime that crystallizes into diamonds and snowflakes, to man, was well noted. Coleridge superbly expressed it in a famous passage as follows: "The metal at its height of being seems a mute prophecy of the coming vegetation, into a mimic semblance of which it crystallizes. The blossom, the acme of vegetable life, divides into correspondent organs, with reciprocal functions, and by instinctive motions seems impatient of the fixity by which it is differenced from the flower-shaped butterfly that flutters with free wing above it. And most wonderfully do the muscular life in the insect, and the arterial in the bird, rehearse the adaptive understanding and the moral affections and charities of man. Who can contemplate the filial and loyal bee; the home-building and divorceless swallow; the intelligent ant tribes with their commonwealth and confederacies, their warriors and workers, the husband folk that fold in their tiny flocks on the honeyed leaf, and not say to himself, Behold the shadow of coming humanity? All things strive to ascend; and ascend in their striving."

The Duke of Argyll, after a strong presentation of the subject, although emphasizing the spiritual unity of Nature, adds: "And of this unity, we who see it, and think of it, are a part. In body and in mind we belong to it, and are included in it. The habitual attitude of our thoughts is otherwise. We look on Nature as something outside of us, on which we can look down, or look up, according to our mood—something to which we are exceptions, and which we can and ought to regard from an external point of view." So, at both ends, the evolution view of Nature crowds in that which before stood alien and dissevered. That which "was created" it shows to be a chain of sequences united and interdependent. That which "created" it shows to be the interpenetrating cause, the principle of life, the all-embracing and the all-embraced. That this is a far nobler conception than that which makes Nature a thing, made up of dissociated parts, even antagonistic factors, falling from the hands of an outside dissevered power, seems too evident to be doubted. The creationist can only show us a personal Being accomplishing six separate and special designs. These designs include other separate creations, called species. One day does not develop out of another, but is the result of an arbitrary fiat. Amendments are even made as the worker proceeds, such as the construction of woman to supplement man. In the progress of knowledge, this maker of worlds and men developed into the great Final Cause—the hiding-place of all our ignorance, and the solvent of all puzzles. Evolution denies the outside force, the designer, and finds in Nature all force, and all forces necessary to account for facts and for progress.

Evolution is only a larger generalization of facts. It lifts man higher to survey the universe by a larger sweep of time. So that we say of all history and all life what we used to say of a single creative day: All, all is law, and there is no miracle. We see no special interferences of an outside force in processes that sweep through countless millions of years. Evolution carries you precisely where Plato and Paul carried you before—to a being, or life, in whom we and all things live and move and have our being. God becomes the term whereby we express the fact that life and will and sentience are primal facts of the universe, and not secondary, or originated. Simply we lose the idea of final causes, to which we attribute the origin of things, and secure instead eternally persistent causality. Evolution, even in tendency, is not atheistic, but, lifting us out of our petty conceptions of the divine, it shows us our relation to supreme life, that, living, was always manifested, and of whose manifestations we are one. It is more and more palpable to those most in sympathy with Nature that it is a continuous adaptation of means to ends; and, while there is no reason for believing in a Designer above, and outside of Nature, there can be no conception of Nature apart from design. The design is persistent in Nature, and not imposed from without.

I desire in this lecture by no means to construct an argument out of evolution, to determine what its final voice must be concerning the power and wisdom and purpose in the universe, but only to anticipate the prejudice that exists, and remove the grounds of the bitterness of those who oppose the hypothesis as atheistic. I shall, before closing my lectures, undertake a more exact and thorough discussion of the God of evolution. I wish at present to show you that there exists no overwhelming moral reason for sustaining the popular conception of a creator. Creation projects on the past history of the world this picture: 1. A God who, heretofore existing alone, creates out of nothing world material. 2. Of this world-stuff he constructs, in successive periods, such creatures as he chooses. 3. This being remains apart from his creation. 4. He labors a certain number of days, and then rests. 5. A destroying element appears, that disrupts and nullifies his plans. Theology is an effort to expound this system, and to show why the purposes of an absolute creator miscarried, and how from the general break-up a fragment of mankind may be rescued. Theology is not contemptible in itself, for its views involve much of the lovable and beautiful; but it is when you undertake to apply it to the universe that you discover how fatally incompetent it becomes. As the Bishop of Chester has recently said: "It is all a mystery why God should have remained alone, until at a certain moment in eternity he decided to create worlds. The fact of creation is itself a mystery. How could God bring things out of nothing? How can we understand his having existed from all eternity without creatures of any kind, and without need of any, and then having of a sudden brought numberless beings into existence in whose welfare he is deeply interested, yet without having thereby added to his own happiness, which was perfect from all eternity? Yet this is one of many mysteries we are forced to admit if we acknowledge a creator." This is, indeed, a sad dilemma for a bishop, and a worse one for those compelled to accept him as interpreter.

The picture limned by evolution presents us a universe that is without beginning and without end, uncreatable and indestructible, yet undergoing ceaseless progressive changes; the adequate causes and the adequate purpose, intelligent and ethical, being involved in itself. To my mind evolution is the really theistic conception, while its opponent is truly atheistic. Having reduced eternal life and eternal purpose to the terms of designer and maker, it pushes him as far back of order and law as possible; and leaves him at last a mere pigmy of will, considering the final disposition of the flotsam and jetsam of his creative purpose. Evolution has at least no axioms that undertake to controvert rational and scientific theism. But, if not directly and positively atheistic, it is urged that evolution is such at least in tendency, for "it robs God of the glory of creating." No more than it robs God of glory that every babe is born by a natural law of descent. Evolution brings us into the literal presence of that eternal unity, the One that involves all intelligent and moral processes and purposes, and in whom we have our being. Wallace goes so far as to say "it is not improbable that all force is will force." Certainly the universe contains all of cause, as well as all of consequence.

The believer in special creative acts affirms that to-day there are precisely as many species of organic beings as a God originally made; that is, a definite number of typical forms exist which have not descended from each other, nor have they ever been able to cross demarkating lines. Each species has varied by itself, but there are no mixed species. Or, if any cross has occurred, it has proved sterile and at once vanished. Instead of a unity of life on the earth, we are to believe in a large number of alien stocks. He further avers that man is above, not a part of, sentient nature about him, in any other sense than that he is the workmanship of a common designer. Between him and lower life there is no kinship. The life or vital force of the world has not even creative unity; no flow from simple to complex.

The evolutionist, on the contrary, asserts that one principle and potency has always, as it does to-day, pervaded Nature, whereby from the lower has steadily risen the higher. The laws of variation I gave you in my last lecture; but their summary in brief I will repeat: 1. All animals and plants vary, partly by the force of heredity, which itself involves more than uniformity; partly by the force of external circumstances. 2. The struggle for existence ends in the survival, in some cases, of the strongest, in others, of the most adaptable—always of the fittest. 3. This elimination and survival leads to the gradual creation of new species; and in the long run, to new types and higher organic functions. 4. In this manner, from the primordial cell has been evolved all multifold forms of life that people the earth. Whatever else may be said of this theory, it at least recognizes a unity in living Nature.

Nowhere but under the supposition of evolution is there any room for unity of moral government. The problem of all problems that theology has ever to solve, yet for which it never finds solution, is the antagonism of good and evil. Its only approximate solution is, as I have shown, some form of dualism. There is no unity possible where the primal supposition is that of an absolute moral Being, creating, without hindrance, his ideas into substantial manifestations. A creative perfect cause has no place except at the beginning, or the end. What he does is right, is complete, is incapable of being evil; and if evil occurs it is not to be attributed to the all-wise and all-beneficent Creator. Nor can a perfect creation admit of eternal progress and evolution. It can only rise out of, and go back into the cause. Amendments there may be, on the supposition of rebellious creatures; but rebellion itself is not to be attributed causatively, directly or indirectly, to the all-wise and good.

I desire at the present time only to show you the frontage of evolution as toward the idea of eternal and absolute unity in Nature; unity of structural development; unity of life; unity of moral government. The demand of modern thought; the demand of scientific investigation; the demand of the hoping soul; the drift of philosophy, material and mental; the cosmical summation of knowledge; the highest synthesis of intellect and hope, is unity. We can not investigate history, or psychology, or biology, or archæology; we can not ascend with astronomy, or dig deep with geology, without being forced to unity of Nature as the finality of thought. Evolution, as science, is the science of One Nature; as philosophy, it is the philosophy of One in Nature.

LECTURE III.

THE ARGUMENT FROM GEOGRAPHY.

TO-DAY I wish to talk about certain facts which were the first to suggest to Mr. Darwin the doctrine of natural selection. You are probably aware that his first extended study of Nature was during a three years' cruise about the world. During this voyage he made a special study of the fauna and flora of the Galapagos Islands. These islands lie in the Pacific Ocean, about five hundred miles from the main-land. They are separated from each other by channels of about thirty miles in width. These islands and the adjacent main-land Mr. Darwin found to be occupied by animals of the same sort or general classification, but in all locations varying by specific differences. Those on different islands, although varying decidedly, yet differed far less than from their own sort on the main-land. Here was the problem that gave rise to the entire hypothesis of evolution. The question to be solved was, why do animals or plants, when separated by five hundred miles, vary more widely than when separated by only fifty? If they were made by a Creator, and placed in habitats of his choosing, they should either remain alike, or vary in a like manner. Is there not another law that governs these changes and determines these facts? Mr. Darwin came finally to the conviction that a natural law of variation certainly did control the origination of species; and not the fiat of a maker. If a family of plants or animals be permanently divided so as to be subjected to different food and climatic influences, the two fractions will in time, by natural laws, come to vary in a marked degree. But if you separate them by only a narrow channel, over which they can occasionally cross and recombine, they will vary but in a slight degree, and but very slowly manifest any diversity at all.

Mr. Darwin proceeded to compare facts collected from other parts of the earth, and he found that they all accorded to the law that he had imagined. It grew to be a conviction which he elaborated into the hypothesis of evolution. You see this looks like a very innocent and simple notion of the naturalist, but it was very, very far-reaching in its application. The long quill pen that Luther dreamed of writing with, the feather of which reached to Rome and toppled over the pope, was not so long as the reach of this theory. For, if creatures thus vary according to natural law under a change of environments, they must always have done so; and there is no limit to the degree of their variations. For a long while it was contended that such variation would only take place inside the limit of species. Any species can vary within its own limits, it was argued, but two species can not permanently cross and create a new one. But scientists are now pretty well agreed that species is only an imaginary line. It is a term used to note variations of precisely the same sort when they reach a marked degree, and begin to have a peculiar fixity.

A single instance, however marked, would not have warranted the promulgation of so revolutionary a theory; and you may be assured Mr. Darwin made no haste with his theorizing. But the facts in reference to the Galapagos Islands were soon seen to be confirmed by facts all over the globe, and very startling these facts are.

England is separated from the European Continent by a shallow channel of very recent geological dredging, and, as you might expect, the same species of plants and animals are found on both sides of the channel. It has not been long enough a barrier to allow of any marked variation to occur between the living creatures on either side. Besides, man's relation to the channel is such that most animals would be carried over by his agency.

The islands lying off the American coast are stocked with animals and plants of the same sort as those on the adjacent continent; but the West Indies are occupied by creatures that have very widely diverged from those on the mainland. Why? Because, according to Mr. Darwin, the West India islands are separated from the continent by a channel over one thousand fathoms deep, which indicates also a very ancient separation, while the other islands off our coast are much more recently separated, and by shallow channels. By the creation theory the West Indies and Central America should have identical species, slightly modified. According to the theory of evolution the facts should be precisely as we find them.

As things *are*, animals and plants in any land are determined not by climate or similar conditions, but by separation from or easy access to other countries. A high range of mountains or a deep sea channel divides one species from another, or has separated by its occurrence the individuals of a species, and compelled them to develop in diverging lines. But if man carries over the creatures from one side to the other, they will often thrive there better than the native stock. Could a mountain range or a deep sea channel have hindered a Creator in the wisest distribution of what he made?

Alfred Wallace, who next to Darwin has been the ablest of investigators, tells us that while sojourning and studying in the Malay Archipelago he found that the fauna, and in part the flora, to one side of a crooked but not wide channel, differed very widely from that on the islands on the other side of the channel. Imagine a large number of islands of all sizes flung together promiscuously in a sea. There seems to be no reason why they should not all have the same denizens, and the same trees and plants. And so in this case it was from island to island, and across narrow channels and wider ones, excepting on opposite sides of this one channel, running irregularly through the group. It was not only true of the animals and plants but of the races and types of men. There seemed at first to be no way of accounting for these facts; but, on taking soundings, Wallace found that this channel was vastly deeper than any other that separated the islands. The explanation then became easy. Imagine all the islands in the whole archipelago to be lifted up a few feet, as land often is lifted or depressed, and you would see them coalesce until, instead of hundreds of islands, there would be just two large ones, divided by the very deep channel referred to. All the other channels, being shallow, would disappear and would become the valleys of dry land. So you see the inhabitants are all intermingled except across one barrier. Over this they can not cross; on either side of this they are alike; on opposite sides they are unlike. Now suppose there is a depression of land, and the valleys once more fill with water, and become shallow channels. The islands reappear, but the animals and plants are all alike except on opposite sides of the old and deep channel. What we have made as a supposition is a bit of geological history. The islands were in a past age, not very remote, united, forming but two; and were made many by some volcanic cataclysm, or by a more gradual subsidence. If you insist that a God created the inhabitants of the islands, is it not strange that a narrow channel of water could have hindered him from making them all alike? It looks wonderfully like evolution.

Take the case of Madagascar, which lies off Africa, as Great Britain lies off Europe. The animals of England and Europe are alike; those of Africa and Madagascar are not alike. But if you go clear across the Indian Ocean you will find the congeners of the Madagascar flora and fauna.

If evolution be true, then the channel that separates Madagascar from the main-land must be very deep, and, geologically, very old ; and so it verifiably is.

But note this, that while, for the most part, land animals find in deep sea channels and high mountain ranges barriers that they can not pass, butterflies, bees, bats, and birds are not thus debarred. They fly over, or are borne across on wind currents. Creatures once permanently separated go on varying until they specifically differ, and at sight you would not imagine they came from common stock ; but species that can fly over barriers constantly intermingle, and retain their similarities. They vary as the ages roll on, but they vary together. So fact on fact, and series of facts, crowd upon you in a compulsory way to accept the theory of evolution. There is not one fact going to show that Nature could not produce her own alterations ; or that a Creator either originated, or at times modified, the forms of life.

Consider further that the creatures which now exist in any locality correspond to the fossils of those animals that formerly existed in the same locality. For instance, New Zealand has no true milk-giver or mammal in her fauna ; neither has she among her fossils. But New Zealand has today great birds with undeveloped wings ; while in the fossils of her islands you find creatures of the same sort. South America, both in its living fauna and in its fossils, gives mammalia of the order of the sloths and ant-eaters. These facts all point to the general conclusion that the living species are descendants of the fossil species, and that they have retained their identity through long periods purely owing to isolation. The deep sea channel to which I referred as dividing the East Indian Archipelago, leaves Australia and a few adjacent islands to a marked isolation from all other lands. Here we find a peculiar class of animals, found, except in a few inferior creatures, nowhere else in the world. These are the very oldest of all mammals, the marsupials.

The fauna of Australia is almost wholly confined to creatures of this class, showing, if evolution be correct, a very ancient isolation ; a supposition which geology confirms as an assured fact. We are at present consulting geography, but we must ask geology to help us. Geography considers the surface of the earth, geology goes down into the depths. From the latter we learn that a great many millions of years ago there were no mammals on the earth, and that the first to appear were of a very humble sort. The very first were these marsupials, creatures that carry their young in pouches during a part of their gestation instead of in their wombs. The egg-layers eject eggs to be hatched. The first quadrupeds did not eject eggs, but ejected their young from their wombs half developed and carried them in sacs covering the mammary glands ; there the young clung to the teats out of sight until they arrived at that stage when later mammals give them birth. These marsupials are half way from egg-layers to milk-givers. They appeared all over the earth at a period when they had no other quadrupeds to compete with them ; no lions, or elephants, or deer, or dogs, or horses. Humble as they were they ruled the world. Geology calls it the Triassic era. About that time Australia was severed from the mainland and became an island. Before the end of the next geological epoch, higher and stronger animals appeared on the continents, developed as evolution asserts from some branch of the marsupials. These destroyed the humbler forms. But in Australia marsupials remained marsupials. They evolved a great many new forms, but not one of them was a milk-giver of the higher sort. So, to the present day, Australia and the islands that were cut off by the deep sea channel are inhabited by varieties evolved from the earliest quadrupeds ; but not one has evolved out of the marsupial type. This isolated nature of its land animals is also true of its fish. A certain species of fish lives nowhere but in its rivers, although at one period it lived over the whole globe. The

Port Jackson shark, which was formerly widely distributed, is now confined to Australian seas. But still more striking is the fact that the types of plant life which in the Triassic period covered the whole earth, still rule in Australian soil, and occur very rarely anywhere else. Australia is, therefore, a survival in all its life forms, vegetable and animal, of what the world was millions of years ago. Natural causes, and these alone, fully explain why its animal and plant life is so foreign to the rest of the earth's inhabitants.

But the voice of geography is not yet silent. When you study the animals and plants of the Old World in comparison with those of the New, you find another curious set of facts bearing in the same direction. At the northern extremity of both hemispheres the animals are very much alike. But the farther south you go the more they are unlike. When you get as far down as Africa on one side, and South America on the other, there is a total dissimilarity. In the north you find reindeer, cats, dogs, deer, foxes, bears, common to both Asia and America. But in Africa you come upon the giraffe, the rhinoceros, the hippopotamus, the lion ; while in South America you find none of these, but instead the lemurs, armadillos, and jaguars. Where there are allied species they are structurally very dissimilar. The ape of Africa is long-tailed, flat-nosed, and has six molar teeth ; while the ape of South America is short-tailed, thin-nosed, and has but five molars. This is equally true of the fossils of the same countries. It looks as though the two continents had once been united more closely, and under a more favorable climate, so that animals readily passed from one to the other. The animals at the southern ends have therefore been longest separated, and by the evolution hypothesis should have most largely diverged in structure and habits. The surest investigations of a geological sort confirm this theory, showing that at an earlier era the North Pacific and North Atlantic were in large part land, constituting a North Polar continent.

The argument from geographical distribution may be summed up then in this form: Animals and plants are not distributed according to latitude and climate, nor according to their special adaptations to local food and other necessities; but are distributed and divided according to impassable barriers of land or water. On one side of a high mountain range will invariably be found animals largely varying from those just the other side, although the distance be only a few miles. This is not what a wise Creator would have done. This is not what men allow to continue. We rapidly redistribute plants and animals on a different basis. Those that best thrive in America are brought here at great expense. In my yard I have representatives of the flora of every quarter of the globe. My fruits are collected from the whole round world. But if, instead of going a short distance over a deep sea channel or mountain range, you go a thousand miles over a territory which has no insuperable barriers across it, you will find everywhere the same or very similar animals and plants. Scattered all over the vast area of Brazil you may hear birds singing, as you might say, dialects of one bird language; and innumerable forms of the same species slightly varying, and many species of the same generic character. But if you cross the Andes you find all is changed. On either side the variations are palpably the result of temporary or partial isolation, affected by food and climate; but a mountain range has caused such a long-continued and total separation that species have diverged far more widely. Over the present United States and Canada roam a few straggling herds of buffaloes and antelopes. These are the remnants of vast herds that formerly ranged from the Atlantic to the Rocky Mountains, but beyond the Rocky Mountains are and were rarely if ever known.

It is precisely as when you find races or tribes of men speaking languages derived from common roots, and having more or less common features, and identical customs.

You trace these tribes at once to a common ancestry. In the case of animals and plants, it is rational to apply the same logic. And the application of the argument is here—have these variations, limited by mountains and seas, themselves natural boundaries, been the result of climate, sexual selection, and the survival of the fittest, or did a God create in these localities all the species now found? The scientist refuses to appeal to supernatural causes when natural known causes will suffice. Real infidelity consists in pushing aside evident natural relation of cause and effect, in order to establish a theory of less natural or non-natural events. It is fully sufficient to say that a family of creatures, so divided by the rise of a mountain ridge that they can not pass, will slowly but surely vary in plumage, habits, limbs, and language, until the descendants can only be identified by a scientist as coming from a common stock.

It seems most rational to suppose that islands have become stocked with plants and animals from adjacent continents, either by a chance float, an iceberg, or at a time when the island was connected with the mainland. It certainly looks that way when we consider that no island very remote from a continent has on it a toad, a frog, or a newt. These creatures are immediately killed by sea-water, and can not, by ordinary natural causes, be transferred to islands. But here it seems that supernatural causes are equally inefficient; that is, where Nature fails, supernature fails also; or are we to make it a point of faith that a Creator decided to make frogs, toads, and newts everywhere else, but never on a remote island? Even then we must remember that these islands were for the most part, in ancient times, united to and parts of continents. Evidently at that time these creatures were not on the continents.

The power of plants to traverse the globe is at first thought far inferior to that of animals, but by closer consideration we shall see the truth to be just the reverse. The locomotive power of plants is remarkable. Creeping plants travel many leagues by rooting, and then starting forward again. Streams are crossed by seeds that float and seeds that fly. There are vast invasions of this sort going on all the time. New weeds come in, covering a whole State in a few years. But the commonest method of all is for seeds to travel in the crops of migratory birds. In this way we find the plants of northern Europe strung all the way from highland to highland, clear down to New Zealand. On every point where the temperature is cold enough you will find plant cousins. But the southern species do not travel so easily on the return track, because it is easier for plants to adapt themselves to slightly warmer conditions than to slightly colder. Is this an instance of creative design, or of natural adaptation?

But there are facts of a similar sort not so easily explained. There are plants on the Andes identical with those of the colder parts of North America; and they are found at no intermediate points. So European plants are found on the higher mountains of Central Africa. These in some cases are such as can not be referred to birds of passage. You know that, by general agreement, it is now held by scholars that the world has had several frozen or glacial ages. The one that closed about eighty thousand years ago is estimated to have been in continuance one hundred and sixty thousand years. One result of such immense climatic changes would be the slow transference of Arctic life to a lower latitude. But when once more the cold receded the heat would destroy this Arctic life, except on high mountains, where the temperature remains frigid enough to suit them. Here, then, is a natural cause for the facts stated above. It is not necessary to suppose that a Creator climbed the mountains of the tropics to plant on them arctic vegetation which he had already carefully distributed near the earth's poles.

The conclusion of Darwin and Wallace finally becomes overwhelming, that the maze of life about us is not without a plan; but that the theory of special creations is so much less rational, so much more void of purpose, and so empty of any relation between consequence and cause, that we are driven to believe that the different species of plants and animals came about by slow changes of structure, wrought by climate, food, and other purely natural influences.

LECTURE IV.

THE ARGUMENT FROM GEOLOGY.

THE earth lies before modern investigation as a great book. Its pages are written closely with records of past ages. Can we read the book? If so, is it not the real work of God? When Agassiz was holding his summer school at Penikese, he said to his pupils: "I will not allow you to be irreverent in the study of Nature. In your churches you require me to be sober when I listen to the word of God. You shall also be serious when, with me, you study the work of God." What the earth has ever done it has carefully recorded; only, like all ancient historians, it has been careless about dates. To-day we will see what this record has to say concerning the creatures and the plants that have lived and passed away during the millions of years before man appeared. It is a wonderful story; and the crowds of living beings that have successively populated the globe not only go beyond our methods of computation, but beyond our stoutest imagination. Only for geology we should know nothing whatever of them. But as it is, the rocks not only contain specimens of many or most of these animals, but tens of thousands of feet of rock are made of such creatures, pressed away as limestone or chalk. And tens of thousands of more feet, yes, miles of depth in the rock strata, are made up of the vegetation that once clothed the earth in green and gold. We now dig these animals out as chalk to write the problems of the human brain, and cipher the lesson of our predecessors. We dig the plants out as coal to drive our engines and give us mastery over the physical forces about us. Is the lesson of the rocks favorable to evolution ? We shall see.

To those of you not familiar with the general structure of the earth, it is necessary to know that, excepting a thin layer of soils and gravels and water, the earth, for at least many miles down, is everywhere rock. Whatever the center of the globe may be, whether molten or solid, there is certainly around the center an immensely thick crust of rock. The outer portion of this rock is in strata of very different materials. Very, very low down is the coal, a good deal nearer us is the chalk; and so different substances are piled in layers all the way up. The oldest of these rocks are called Primary, because they were first made. The next are called Secondary. The third, including the more recent classes of late made rocks, are called Tertiary. I say late made. So they are comparatively, but their making covered many millions of years. Then, on top of these latest made of all, lie the Post-tertiary strata, ending in the really recent deposits. But, before the Primary were established, there was doubtless a vast length of time when the globe was just beginning to cool, and the semi-solid surface was broken up and its history of formation lost. For a long way down the rock strata are more or less replete with remains of the life that existed while they were forming, and in some instances the rock is almost nothing else but fossil remains of life. The earliest of all life-forms were so entirely gelatinous, so slightly organic, that for ages they could have left no traces. But later there came in shell-making creatures and hard-wooded plants, and these were packed away and pressed down in enormous masses, and calcined for eternal preservation. And the form was wonderfully preserved, so that we can see to-day the precise structure of a tree or an animal that passed away millions of years ago.

But how are we to get at these strata laid down age after age and then covered by succeeding ages? I will tell you. Solid and thick as this giant crust is, it is never at rest. The earth is, and always has been, steadily cooling and slowly shrinking. And, slow as that shrinking is, yet it produces lateral pressure enough to squeeze up ridges of mountains five miles high. So the crust is everywhere broken, and strata that lie miles deep down are turned up edgewise; and you and I walk over the edges and study the contents. Nowhere is the crust unbroken, but jagged edges rise to the surface with their secrets and their treasures. Norway, as an instance, is rising over two feet every hundred years. In ten thousand years this has made, and will make again, two hundred and fifty feet. Other countries are proportionately subsiding. This wrenching, and bending, and squeezing, and lifting has always been going on. So we get at the real make-up and a good deal of the history of the globe we inhabit. This history we call geology.

Go over to Trenton Falls, where some of you live and from which place you have come to hear me to-day; there you will, with eyes and ears well opened, hear one of the most wonderful sermons any day of your life. Going down into the gorge cut by the creek, you stand between walls of limestone one hundred feet high; but that is as nothing to the depth of the same rock not cut through and worn away by the water. Pick up a piece of rock anywhere, at the foot of the lower fall or above the upper fall, and you will find it is composed almost entirely of more or less broken shells and corals. These shells are lime abstracted by their owners from sea-water, and uncountable generations must have been packed away here. Occasionally you find a beautiful trilobite, which was a soft shellfish of the earliest sort. If a geologist were to happen along, he would tell you that these are among the oldest of the world's rocks that contain any life-forms; not the oldest, but near the oldest. You and I, in walking on Utica shale and Trenton limestone, are walking on what was made many millions of years ago, when our earth was just getting cool enough for extensive life of a very simple form. You will find no vertebrates on the earth at this time, no true fishes, no birds, no reptiles even. It is long before the great coal-fields were deposited, and still longer before the chalk cliffs were piled up. If in these rocks you could find the fossils of such creatures as occur in later rocks, geology could not be counted on for evolution. The simple question is, Do the simplest forms of life occur in the older rocks, and the higher forms follow on with later rocks, until, in the latest deposits, we find mammals and man? This is precisely the testimony of geology. In the oldest rocks occur the most simple types, in later rocks creatures of a higher order, until near the top you come upon the vertebrates, of whom the mammals appear latest. Through the Primary and Secondary rocks you search in vain for any highly organized structure. In the Tertiary only you will find them; and there, from bottom to top, that is from oldest to most recent, you will discover a gradation and progress in structural formation. It is as if Nature wrote her own autobiography, using for an alphabet the hieroglyphics of life.

Fossil history follows this line: (1) Fish, (2) amphibia, (3) reptiles, (4) birds, (5) mammals. Call these five chapters in the book of life. Now examine the last chapter, mammalia or those that give milk, and you will find that it opens with marsupials and ends with man. That is, fossils present themselves in succession precisely as their complexity lifts them in rank. It looks wonderfully as if there had been an evolution from lower to higher. How long is this record of life? Well, I told you geology is not very good at figures, but Sir William Thompson, who is good authority, says you may safely call it at least one hundred millions of years; others make it three or four times as long.

But the advocate of the creation theory answers, according to our inspired book, that is precisely the order in which God created all things:—first vegetable life, and then fishes, then animals, and finally man. He forgets that by the same account all fish life was launched on the seas at once, and all animals in the same way. But geology shows no such thing, for there is a grading of fish life and a grading of animal life from the older rocks till the later. The lower animals existed millions of years before the more highly complex in structure and function. Volumes enough have been written to make geology harmonize with the myth in Genesis. They do not and can not be compelled to agree. Honest investigators are weary of the attempt.

Geology even goes farther, and obliterates the dividing lines between the days or eras of the supposed creation. There were no distinct and separate periods of making, or of evolution. The whole history of life, as told by the fossils, is a continuous unfolding and evolving of new forms from first to last. Nowhere do you find a set of existences finished, and the work so completed that you can say here is a special period, a creative day followed by a night. The origination of new forms, so far as traceable, is ever in process. So with the perishing of old forms. Some are constantly going out, others constantly appearing. On the average, at any one time, one third of old forms are in continuance with two thirds newer or recent. In some cases ninety per cent of the existing life is old, and only ten per cent recent. The strata of rocks change; the inhabitants lap over. Precisely so is it to-day that we have among our living animals representatives of excessively ancient eras. This is specially true of the ocean, where there are doubtless living forms of the reptilian sort not yet discovered, but of an old geological type. Elephants represent the day of mammoths and mastodons; opossums represent the age of the beginning of mammals. The dodo has only just disappeared. It was a representative of an era of enormous birds of considerable antiquity. At that time there were eggs equal in bulk to one hundred and fifty hen's eggs, and some of the egg-layers stood twelve feet high. This evolution of successive forms of animals and plants has been continuous for many millions of years. You can make this harmonize with the theory of a Creator only by supposing God to have said every few years, now will I make an ammonite; now will I make a more highly organized ammonite; and then again a better ammonite. Or, now will I make a worm, now a tortoise, now a horse with five toes, now a horse with four toes, and now a horse three toed; and so on until the solid hoofed and fleet friend of man was made. I shall hardly dare to really draw the picture lest some one shall charge me with trifling with his sacred convictions. There certainly were, in what the creationist terms a creative day, successive appearances of species and orders, starting not at one creative fiat, but following at intervals for tens of thousands of years.

You can even classify in zoölogy or in botany the fossil plants and animals with living plants and animals; indeed, you can not separate them. And in the long ages of any single species, the nearer to our age the fossil belongs, the more like its living representative it will be. The old trilobite of Trenton Falls has a relation now living, but they are not very close in their kinship. It is impossible to read this story of the steady progression and interlinking of all life from the outset, and overestimate its value to the evolutionist.

It is furthermore true that while certain formations date far back geologically their creation is still going on. The chalk belongs to what may be called the middle period of life, or mesozoic, but chalk formations are now taking place. If this be so, the Creator has not yet finished one of his days' work. The God of Evolution is never through. His Father "worketh hitherto," and the evolutionist works.

Geology does not leave the record even at this point, but shows us transitionary forms. Very low down in the rocks the belemnites and ammonites, as well as other structures, appear in masses of temporary forms, but of systematic transition one into another. The saurians also involve in their structure the bat, the bird, and the reptile; out of which complexity Nature at later periods picked separately the bird, the reptile, and the bat. Still later creatures occurred, out of which, curious as it may seem, were evolved in one direction the turtle, in another the horse. Even man himself appeared at first, as his remains show, in a transitionary condition. Little as we yet know of the fossils of earliest men, we yet find in the skull roof of the oldest a bone not found in the skull of men now living—a bone characteristic of a lower, less complete organism. Of two very ancient skeletons, one of the most careful anatomists says: "They show us no less than eight marks of a lower formation." You must remember that our investigations of geological strata cover only an insignificant fraction of the world's crust. Those most studied are most remote from the earliest home of the human being. Time will, no doubt, uncover to us vastly more of these transitionary stages of evolution. Missing links, both fossil and living, are constantly being found, and more may be expected at any hour. This very day word comes of the discovery of an egg-laying mammal; that is, of a connecting link between birds and mammals. It has not given over the habit of laying eggs; but it suckles its young. It looks like a beaver, and it is covered with scales; but its tail is covered with hair, and not scales, so that here is a transition from the characteristics of a reptile or fish to a mammalian quadruped. Ah! my friends, the missing links come quite as fast as we can endure the startling character of the revelations that they make. It is not only possible, but almost certain, that we shall yet find remains of men very much older than any yet found; and the probabilities point to greater divergencies toward lower animal structures. But transitions are not, as often supposed, protracted; in most cases, perhaps, the transition is speedy, or even sudden, and the tendency to inheritance grows rapidly stronger as the tendency to variation grows weaker. To our brief lives the transition would seem very long; to geology, it is very brief.

Most remarkable is the fact that many of these forms that Nature creates and then apparently drops out are still in existence during the embryonic life of their descendants. As if Nature had taken a pebble, and formed over it a finer crystal. The old-time animal appears now only in the womb-life of a later creature.

To enable geology to present its argument as vividly as possible, conceive the earth as it actually was at any given epoch—say about ten million years ago. Among the animals there is a beautiful little pony, anatomically the ancestor of our horse, but four-toed, and no bigger than a St. Bernard dog. Then there is an animal from which come our antelopes and deer, but it is itself neither the one nor the other. The ancestors of the Primates are also here, from whom come afterward ape and men. These three groups, now so widely diverged, were at that time evidently of kin; so that the ancestors of horses, antelopes, and men were cousins. Anatomically closely related, they have led on to the lordly man, who mounts the horse to hunt the deer. There is no monkey in the picture, no horse, no bear, no cat, no antelope—none of the species of mammals we now have, but they are potentially there mixed up or just emerging from prophetic types. In all past geological days this feature of mixed types is more or less apparent. Especially was it so in the time of the saurian monsters, which were at once rodents, carnivora, herbivora—parts of each and all flung into one confused form of life. The same creature flying like a bird, paddling like a fish, or jumping like a toad. Man was in the structure potentially all along; but as man he was not yet gotten out of the anatomical snarl. Evolution would in time pick him out. There is nowhere along the line the token of a special Creator.

Summed up, the argument from geology is this: The life-bearing rocks that girdle the earth are about 1,300,000 feet in thickness. The lower half of all this crust contains only the fossils of the lowest orders of vegetable life. Above these appear reptiles, fishes, and evergreen forests. For a while life goes madly on in a rollicking, glorious profusion. Then a change begins, and quality engages the attention of Nature to the sacrifice of quantity. Then one after another come all the later and more admirably useful and rational creatures. With them three or four families of trees and plants are evolved, without which mammals could not continue to exist—certainly not to evolve progress. The rose family, including apples, pears, plums, cherries, peaches, apricots, strawberries, raspberries, blackberries, and roses; the cereal family, including wheat, rye, rice, corn, oats; the solanum family, including the potato, tomato, and tobacco; the palm family, including dates, cocoanuts, and nearly one thousand other varieties of trees useful in fiber and fruit—these are evolved, together with the human family, mutually dependent. But none of these things occur in any strata lower than a few hundred feet; in time, a few hundred thousand years ago. Such is the story. It is infinitely more wonderful and more divine than the supernaturalistic myths of ancient religions. The only divine thing in the universe is facts; the only true religion is the worship of truth. Let facts lead us where they will, they will lead us only on the highway of a higher life. Evolution moves on; and each man is in himself a microcosm of the world to evolve in his own nature infinite progress. In us is concentrated that force that brought the cell up to man—to bring us at last up to God.

LECTURE V.

THE ARGUMENT FROM ANATOMY.

I. *Embryonic Life.*—Incidentally I stated in my last lecture that earlier organic creatures in their finished state were what later organisms are in their embryonic life. It is reversely true that the higher animals rehearse in prenatal life the stages of development gone through by their ancestors. An abstract of past life-history is thus preserved. This is true of man also. Every individual, starting his existence at the cell, becomes successively whatever the primordial cell became on the road to man. He can not become a living being by any other path. He must start at the cell, as a cell, and neither then, nor for some time after, can he by any possible means be distinguished from the germ of any other creature or plant. Thereafter, stage by stage, this germ, in common with others, must move forward toward its destined organic completion, without omitting one mile-stone on the way. Whether sponge or man, a perfectly similar cell develops similar growth, and creeps about in identical manner. Slowly the embryo develops organs that identify it with the fishes, with vertebrates, with mammals; and at last it picks its way out from among the mammals, and is born a man. But while a vertebrate, at a certain stage it is only the skilled anatomist that can distinguish this human fetus from that of a dog. The creative process is here in actual progress, and instead of being the work of a Being extra-natural, it is Nature herself. What next? It needs patience. Here are the traces of feet; but the hands and feet of men rise from the same typical dots as the feet and wings of birds, or the four feet of quadrupeds. But at last the final turn is taken in the highway to humanity; the embryo has differenced itself from all things in turn; it has stopped not at the fish, nor the Tertiary quadruped, but stands at last by itself, glorified, as the supremest evolution of life. Henceforth, all energy is bent toward brain-case and brain; and toward the delicate structure, so full of power and tenderness, the hand. It balances the brain-case well on the end of the spinal column; and by the time gestation ends it is the image of the true, beautiful, and good—the holy, the sacred, the wonderful, the infinite. What a history is this! Man lives before birth a vastly long life. He already is immortal.

By the theory of creation, what does this mean? What has man to do with being an animal? Is this a meaningless panorama? Evolution alone gives us the explanation. Man is descended from all preceding life; he was evolved in a succession of evolutions. By whatever life-road any line of evolution traveled to achieve an organic form, that road each individual of that organized family travels over again to reach birth. The story of heredity is told over and over again by each fetus—over and over, so that it shall be at last read by him whose duty it is to know the truth of his origin. By heredity, therefore, man has in his structure, as a part cf his own selfhood, all previous life-work. He hastens through his animal and pre-animal career in the womb; and at birth has reached very nearly the stage of self-conscious reason.

Let us study this embryonic story more closely. Anatomists tell us that at a certain period the human embryo has the gill-slits of a fish on either side of the neck, and that the arteries run to them in branching arches. Certainly Adam, if made out of hand, never had gill-slits! Can you tell how the children of Adam came to have a fish heredity in them? At another point the human embryo has a tail, which, during its continuance, is longer than the legs. Again, at a later period, the whole body is covered with fine hair, even the forehead and ears; and a very close woolly covering it is—only the palms of the hands and the soles of the feet, as in animals, remain naked. These are only a few of the chapters, or sections, of our curious pre-natal history, so clearly demonstrating the doctrine of descent from animal progenitors.

Our psychological descent is quite a parallel case. The child of to-day is born with ability to acquire knowledge and generalize facts that his ancestors a thousand years ago did not have. Facts lay about those men that they did not see, or, seeing, had no power to associate with adequate causes. The children of to-day are born reasoners. There is a certain embryonic progress of mentality—a pre-natal evolution—so that by ten or fifteen years of age a child can grasp more than earlier generations could grasp in a lifetime. We are affrighted at times at the piling up of sciences. We say no one can master them all, or a tithe of them all. Yet somehow Nature hurries up the intellectual power of the race, so that measurably minds do keep pace with the vast increase of knowledge. For instance, generations of musicians work with tireless application and sore toil to master the technique of their art. The tendency is to bring about a family possessed of superior musical talent. At last one is born who, in early childhood, does with ease, by instinct, what his ancestors did with great difficulty after years of labor. When Mozart was a boy of eight he was first shown an organ with pedals. The little fellow at once stood up on the pedals, and, treading them, played as if he had been long in practice. Those who saw and heard said, "It is the gift of God." It was really this tendency of Nature to crowd back into embryonic life a large part of what has been the burden of living. So your peculiar life-work will be worked out, in part, by your children before their birth. It will all have to be done, but not by conscious effort. In each generation this tendency to put over a fraction of individuated existence into pre-natal unconscious achievement is active. The result is hardly noticeable in a single generation, but the process is never suspended. A million years from now all that at present makes up our conscious living and doing, or a large share of it, will have thus been packed away for automatic womb work; and the future man will have his birth, so far as mental power is concerned, at a point somewhere ahead of where we end ours. As organically the larger part of construction is already accomplished before birth, so the larger part of intellectual and moral evolution—the later achievement of men—will be made pre-natal. Moral will of yesterday is moral instinct of to-day. Our cannibal ancestors gave up their carnivorous feasts with a struggle; but we are born with a bias and habit for finer feelings. Nor is this all; were it possible for a babe to be born and to live at some point of its fetal career when its structural development was at an animal point, it would doubtless manifest animal traits. So it is that some are born with mental development arrested at some pre-natal point, and are through life animals in verity. As a race progresses in civilization and enlightenment, its children are born at a higher intellectual and moral average—as we say, born older and wiser. The savage's brain in a life-time is not able to go as far in the way of logic as one of our boys at ten.

So we find that both in structural and functional, in our physical and intellectual career, the past and present constitute a consecutive history. Man from his inception as an individuated cell, till he stands as either a Shakespeare or a Falstaff, has passed along the same road, through all the byways of animal progress. He has lived, in epitome, through millions of years. It looks as if Nature, envious of Darwin, had forestalled him, by writing out on the ovum of Darwin himself the story of evolution. Do you wonder that Haeckel makes a keen application of the leveling force of these facts to snobs and aristocrats? "What," he says, "are these nobles to think of the noble blood that runs in their veins, when they learn that all human embryos, those of nobles as well as commoners, during the first two months of development, are scarcely distinguishable from the tailed embryos of dogs and other mammals?" What is this whole story but a confirmation of the law of heredity? We inherit our ancestry, in structure and character, not only as far back as our grandfathers, but to the utmost limit of the ancestral line. There are no breaks, but a beautiful process, an established highway, until near the end we begin to exercise free will to shape our own destiny. The marvel is to see at each turn in this life's highway one sort of creature after another turn out of the path, and establish itself at an old mile-stone—sponges, fishes, vertebrate land animals, mammals, men.

II. *Types.*—Anatomy has other important facts to relate. Among them, as bearing on the hypothesis of evolution, none is more important than this, that Nature, having established a type, does not confine it to one sort of creatures, but creates upon it a large number of species and genera widely diverse in habits, methods of life, and in nearly all functional powers. Under the vastly divergent forms and adaptations that characterize the whale, the cow, the lion, the ape, the man, there is established a certain typical idea woven into the foundation of them all, which incontrovertibly establishes an ancestral kinship. The fins of the whale, the paws of the lion, the feet of the cow, the legs and arms of the ape, and those of man quite as certainly, are all only modifications of a single, simple ideal. They are, in fact, one and the same pair of organs, in the embryo not distinguishable, but destined, at fuller development, to adaptations as diverse as those of swimming, climbing, walking, and tool-making. The delicate power of the hand that sets the springs and wheels of a watch in place, or conveys in its clasp the love of a divine soul, is but one differentiation from the same organ that in the bear claws the victim it has seized for food. We are driven either to confess that some author of Nature, compelled by poverty of ideas, copied his work in so many styles that his monkey is very much like his man, or we must believe that these inherent likenesses and common types, in the very framework of divergent classes, indicate a common origin. Embryology, indeed all branches of anatomy, are empty of meaning, and nearly valueless, if no generalization can be made from such facts. Scientists, however, do not feel compelled to doubt the verity of their conclusions in this line of synthetic work. They are steadily tracing back group after group by converging lines—converging as you go back in fossil history—so that it is possible to bring together into one original group all the mammalian quadrupeds of the Tertiary.

III. *Rudiments.*—You will, of course, not be surprised that anatomy has much to say on this subject. Nothing is of more importance than the fact that in plants and animals, as they exist, there are rudimentary scraps of their ancestral descent. These, like memoranda, or a well-kept diary, enable one out of hand to read much of his past history. In human beings the vestiges are numerous. The vertebral column has not only a pronounced tail during the embryonal period, but after birth there is a rudiment still retained. Is it a chip from a creative workshop? or is it a bit of inheritance not yet quite aborted? We also have rudimentary teeth which are shed almost as soon as cut, and are of no value whatever. Prof. Cope does not hesitate to prophesy further progress or changes of structure, under the influence of higher civilization, whereby the jaws of future men will contain two to four more rudiments of this sort, to be aborted before maturity. Muscles of motion also remain with us as rudimentary testimony of our descent. The muscle that in lower animals is used to shake the hide, for cleansing and aëration, is with some persons partially developed and usable, but with most is a useless vestige. The same is true with the muscle used by horses to move the ears. In the adaptive changes that have been necessary during long ages—changes so great as to carry quadrupeds over to water-life, and to turn others into bipeds—some muscles have been lost entirely; others retained with adaptation; others retained without adaptation, or badly adapted; and still others, either not quite given up, or left only as rudimentary. All things are always in a process of being made; there is nowhere evidence of the finished work of a Creator. The biped has muscles that were inherited from the quadruped ancestors that ought to be, and possibly will be, gradually adapted to the biped habit. They are at present a serious hindrance to health and strength. It is impossible to escape the evidences of our descent.

The whale, as you know, is not a fish, but a quadruped mammal, compelled, we do not know why, to adapt itself to water-life. It has many rudiments to illustrate its origin. The bones of the shoulder, forearm, wrist, and fingers, are still retained, but inclosed in a sac to adapt them for swimming. The head retains the bones of a land animal's skull, as they are disposed in the mammals. Nothing, indeed, is changed about this huge bulk but what was necessary to enable him to swim and float instead of walk.

A few years ago anatomists found that the horse, which has now but one toe, was possessed of two rudimentary toes. They said we shall probably some day find the fossil three-toed horse. In 1870, Prof. Huxley said: "We have not only found the three-toed ancestor, but we are warranted in expecting to find the five-toed." Why? Simply because Nature follows types so surely that it was believed the five fingers and five toes common among mammals was the typical form of all mammalian quadrupeds. Since 1870, Prof. Marsh, in his great fossil hunt in Colorado, discovered what Huxley prophesied, that is, a four-toed horse with one rudimentary toe. Did a Creator make horses with rudimentary and useless toes? or did the horse retain them as fragments and evidences of its evolution? Prof. Cope has gone very much further in generalizing in the same line, but I shall have occasion to use his really magnificent results hereafter.

These rudiments are, however, not always merely useless; they are often a serious hindrance or positive injury. Some writers affirm that the tonsils and thyroid gland are such superfluities, which are also the seat of dangerous diseases. In connection with the intestines there is an appendage utterly worthless, and only a vestige of the cæcum of lower animals. This blind passage is a source of great danger always, and not seldom causes death; for food in passing along may be lodged at that point, and produce inflammation; or the appendage may constrict the intestines, and cause an entire stoppage. In lower animals it is an open tube, in use; in man it is useless and dangerous. The rudimentary joints of the backbone, all that is left to us of the animal tail, have often caused serious trouble, and been necessarily amputated. It is hardly possible that we are walking among vestiges where an all-wise Maker has been at work. It is far more rational to see in man a creature of descent, now in the process of adaptation to a biped life of ethical purposes.

Rudimentary organs are not at all of rare occurrence in both plants and animals, and their nature is beyond question. Sightless animals have rudimentary eyes. Did the Creator put in blind windows as an architect often does in your city houses? Plants are even classified by unused organs. That is, environments are such as no longer to call into active functioning certain parts of the plant; in time they may be aborted. The blind fish seems to be descended from seeing ancestors, that became inclosed, at some remote period, in a cave formed by cataclysm, or otherwise. In Mammoth Cave the ordinary catfish is found, but sightless; in Cuban caves are found species of the cod family in the same condition, but with rudimentary eyes. That tendency which in nature, through long ages, by effort and use created visual organs, by long disuse and cessation of desire undoes the work. Energy is withdrawn from useless aims to be applied elsewhere. We understand very well the nature of this tendency, for if we wish to retain in ourselves any function or power, we must exercise to that end. Any power of body or mind disused is on the road to impotence. It is only a question of time when the Hindoo devotee shall have the muscles of his unused sacred arm shriveled; or the rake lose his moral instincts; or the cave-fish his power of vision. Wise use creates; disuse or misuse destroys.

Fossil history frequently illustrates stages of rudimentary organs lost entirely before birth. One whale that has no teeth has them in embryo. Calves before birth have eye-teeth and cutting teeth in the upper jaw. The boa constrictor has hind legs in miniature. The cow has so long disused the incisor teeth of the upper jaw that they fall away before birth. The serpent has crawled so long that his feet are aborted. Charge these half-formed organs to a personal Creator, and you charge him with either unfulfilled effort or with irresolution. Attribute them to evolution, and you see a determinative purpose in Nature, working steadily to accomplish adaptation of organs to environments.

Many creatures of the lower ocean depths are possessed of sightless organs, showing that they have been driven to adapt themselves to deeper and darker water. But energy has gone to construct compensative organs of a curious sort. Their bodies are lined with oculi, or eye-like developments, that serve for the reception of phosphorescent rays of light, as this is the only light that can occur at such a depth. But from what source shall they obtain a steady supply of even phosphorescence? Along their heads and back, imbedded under the skin, are small, round bodies which are self-luminous. This creature thus becomes a light to himself. Generating his own light, as well as his own visual organs, he seeks food, and illumines a pathway through the eternal darkness.

Rudimentary use of organs is also not uncommon; the organ is complete, the functioning transformed. The penguin uses its wings only to swim with; so the grebe uses its feet no longer for walking, but for swimming. Cave crabs retain the eye-stalk of ordinary crabs, but the eye is not in the stalk. Prof. Silliman caught a cave rat that was blind; then exposed it with great care for several weeks to a regulated light, when the animal began to evince a sensation of light. The organ of vision was still capable of recalling to some degree its potentiality.

It is a law of life that when energy is withdrawn from one part of a structure, additional energy will be applied to some other part; so we find the ostrich and cassowary possessed of extraordinary legs, as they lose, or abbreviate, their wings. Reverse the law, and energy, being applied in any special direction with increased force, must be withdrawn from some other; so that when a bird finds its safety better secured by running than by flying, its wings will be sacrificed to secure in time more powerful legs. A blind man sharpens his other senses. Miss Bridgman has recovered largely the power of smell, which has been so greatly sacrificed in human beings, but is so wonderful in lower animals. Unable to see, the energy of attention, in her case, has brought to the maximum that other sense which most of us have in abeyance. You can fairly class the sense of smell in human beings as in a rudimentary state. The dog and the ant and the bee have a power of smell so enormously greater than ours that it seems to be quite another faculty, yet the Australian, as I am credibly informed, can track human beings by the sense of smell, walking on all fours to keep his nose on the scent.

Evolution is the only hypothesis capable of affording any satisfactory explanation of the whole series of facts I have collected from anatomical investigation. Some change of circumstances compels a group or species to seek its food, its safety, or its sport, in a modified manner. This will involve new lines of effort, and thereby evolve not only new functions, and possibly new structural growth, but will abort others. In this way all creatures are constantly undergoing subtraction by effort, and addition by effort. Insects lose their wings by imperceptible degrees, whales their teeth, and man adds to his brain at the expense of his nutritive organs or teeth. Serpents and lizards lose one lung in order to glide more readily through grass, bushes, and obstructions. In birds one ovary is aborted. In human beings of the male sex mammary glands are rudimentary, although in rare instances functionally developed. As the differentiation of sex intensifies, functions which in lower life were common to all individuals of a stock, divide, part going to one sex, part to another. Some plants still possess flowers that are sexually complete and self-fertilizing. Your strawberry-bed shows you flowers of both kinds. Some varieties possess perfect sexuality; others have only flowers of one sex. In lower animal life there is also a lack of sexual differentiation. When sex first appeared it was not a sharp distinction; but in human beings the organic and functional distinction between the sexes is absolute. In the bee family sex is determined at the will of the colony; the queen being the result of special food given to the larva. The determination of sex, thus consciously under the control of the bee, in man is passed over to the sphere of prenatal unconsciousness. There are no more marked cases of rudimentary organs and functions than those determined by the sexual relation.

I try to read the testimony afforded by anatomy as if no general exposition and explanation of Nature had ever been given. Let facts speak for themselves to unprejudiced ears.

We can hold the theory of special creations only by a total sacrifice of logic. We may say, as so often we hear it said, "The ways of God are inscrutable, and past finding out." This is to push all troublesome facts back into the chest, and turn the key on them. It is to give up all effort at a solution of Nature. Reason, thus, by disuse becomes a rudimentary power.

I can not but hold it to be a moral duty to comprehend as far as possible ourselves, and the universe about us. Those who are willing to expound facts as miracles, are equally ready to take leaps of logic elsewhere. Their theology is full of paradoxes, all of which are covered by the same reference to Divine determination. Whatever God wills is right; therefore the palpably wrong, being God's will, is right. Supernatural physics and supernatural morals are equally inscrutable. This method of investigation can end only in intellectual and moral rudiments. I have just received a pamphlet from a most excellent minister, of much ability, whose magnificent church was burned. His manuscript sermons were not seriously injured. He boldly affirms his belief in a special Providence that preserved his papers. He does not see that the very same Providence neglected to save two babies from being burned in the fire on the next street. The good man is troubled with rudiments. His God is a rudiment.

LECTURE VI.

DEVELOPMENT AND REVERSION.

The development of any creature is decided at birth. The pre-natal evolution is of the nature of family history. The post-natal changes are partly of the same nature, and partly of an autobiographical sort. I have shown you how family history is rehearsed by the developing embryo, so that a sponge and a fish start at the same point and travel the same road, and in their company is found the incipient human being. To-day I wish to pass with you in review some of the modifications and remarkable changes that occur in the way of metamorphosis, and see if we can find for these marvels any explanation on the basis of evolution.

On the bark of my maple-trees, about this time of the year, may be seen a cicada, emerging from the cleft back of its beetle life. The hooked claws of the beetle are sharply thrust into the bark, while his narrow head and wingless body splits open from top to bottom in a straight line, with one cross slit; and a new creature emerges slowly, with large gauze wings neatly folded against its sides; while a broad head, with large, handsome eyes, looks out inquiringly into the world. After drying awhile it will unfold its wings, and move off to a free life.

A nest of worms has hatched on my apple-tree. One of them, having gorged himself for a few days on the green foliage of the tree, has crawled into a hole of a fence-board, and, having spun a wonderful cloth all about himself, has gone into a state of quiescence. I know that if I pull open the cocoon I shall find a curious chrysalis inside, that is almost as torpid as death, yet is possessed of sensation. I also know that, if undisturbed, it will in a few weeks cut open its own sac and emerge. But now the most wonderful thing of all: he is no longer pupa, nor chrysalis, but a beautiful butterfly, with organs for feeding on delicate nectars.

The changes which have taken place in both these cases are not sudden transformations, as you would think by looking at them from the outside. The real alterations in structure have been a growth, which when finished is exhibited to the public. The transformation has been along the line of its inheritance, and no deviation from this line will occur, except as food, or accident, heat or cold, or some immediate foreign influence, affects it. But these deviations will occur, and after a while they will be inherited. For instance, with a pin if I can just scratch this chrysalis on the incipient wings, and not overdo the matter, it will come out in its next life with only shriveled or fragmentary wings. Then its life will of necessity be spent in a very different manner from that of a butterfly that can flit free over clover-fields and meadows of mint.

If you will study the life-history that goes on in a hive of honey-bees you will find that the egg that produces a worker is precisely identical with that which produces the queen; that workers will be always hatched from these eggs, unless the powers in control desire to have a queen produced. Then they will feed one of the larvæ with a specially prepared food, and it will be hatched from a specially shaped cell, when lo! *environments* have produced the desired end.

Now, I do not say that the butterfly that is compelled to creep instead of fly will hand that quality on to her successors; but it is possible that a race of butterflies might in time be produced without wings, provided it should prove to be possible for them to protect themselves and secure food better on foot. This is at least true, that in some beetles wings have been reduced to mere vestiges. The males of dung beetles are so invariably without front feet that they have been supposed to have none. It happens, however, as the result of non-use that they break off. Circumstances have made the larger part of the genera of beetles in the island of Madeira unable to fly.

So you find life goes on from the outset under two influences—(1) the inherited tendency to vary precisely like the parents; and (2) to be slightly unlike them on account of a difference of climate, food, or necessities of other sorts. This tendency to change is a tendency to adapt the structure or its functions to surrounding circumstances.

Primitive insects were wingless invariably. They had, however, as some insects have to-day, organs for breathing air in water—gills on the sides. These in later insects were used to propel the body in water and along the surface. By slow degrees these organs were used to lift them out of the water, and carry them through the air. The wing is even yet a breathing apparatus. It contains branches of the animal's lungs, and is used to aërate the body. This comparatively recent origin of wings fits to the fact that fully developed wings are acquired by insects only late in life. They are not an adjunct of the larva or chrysalis, but of the final form of the creature.

There is no part of man or of the higher animals that can not be traced, with great degree of probability, through such stages of development. You have doubtless wondered at the peculiar office of the lungs; and when you find lower animals breathing with gills, and trees breathing with their leaves, you see that aëration is a necessity in all forms of life. Curiously you observe some creatures possessed of gills, and breathing in water, afterward giving them up for lungs, and breathing on land; and there are temporary forms possessed of both methods of breathing. Can the origin and progress of the lungs be traced? I think they can very surely. The lowest fishes have no air or swimming bladders. These are a result of adaptation a little higher up. They vary in arrangement and form, but after a while the closed sac of air or gas obtains a tube communicating with the throat of the fish. This air-bladder by and by gets, in some of the later fishes, to have a double or divided form; that is, there are two sacs united. The polypteri have them not only double, but divided into sections. Then there appear mud-fishes, living in waters that dry up half the year, and in them the bladder is full of cells, and the tube connects it with outer air; and now the bladder is used to purify the blood. In other words, the lungs are a development of the air-bladder; and, by and by, when amphibians begin to live on land and in water indifferently, it is because they have gills to breathe in water, and bladder-lungs to breathe the air as we do.

And now you will see how Nature, having her lungs made as well as some other parts that I have not rehearsed, will take her fish out of the water and create land inhabitants. The old theory and the new agree that fishes appeared before animals, but the old story never could tell why. Evolution gives you the explanation in these words: Life forms were not yet evolved on land, because the apparatus was not developed for them to breathe with. You must think of the air as only an ocean of a rarer, lighter sort than that of water. Creatures began in the denser fluid. Let us see how they will adapt themselves to the rarer.

The egg of a frog we know does not give us a frog at all, but a little creature that can only live in water—a tadpole with swimming apparatus, and gills for breathing like fishes. Some time afterward this tadpole acquires lungs and four legs, breathing with either lungs or gills. In this stage he is amphibious, and lives either on land or in water. But soon the tail aborts, and the gills go with it, and the result is a land animal. First a fish, second an amphibian, and third a land dweller. The probability is that this represents three stages of its ancestor's evolution. As some creatures rehearse ancestral history in the womb, and are born complete, the frog and the butterfly, and many other creatures, go through the evolutionary stages AFTER birth. Other creatures of the same sort exist, that have never progressed beyond the amphibian stage. The axolotl under favoring circumstances develops into a land creature, but under other conditions retains through life his amphibious character. But a still more wonderful illustration of the power of environments to modify structure is seen in one of the salamanders. It hatches its eggs inside its body, and there when hatched they have gills for breathing in the water; and if you take them prematurely from the parent, and place them in water, they will live and breathe. Here is an evident change of habit brought about by a change of the conditions of the home of the salamanders. Possibly an elevation of land occurred, lifting them away from sufficient water, in which their eggs were originally laid. The eggs were then retained in the mother for a longer period, but the gills of the young are not yet aborted.

The tadpole undoubtedly represents what the frog used to be—that is, a fish; and his adaptation to land-life was a long process compelled by droughts and dry seasons. In dry regions of the earth, to-day, frogs go through the tadpole period in the egg; that is, the egg does not break and give birth first to a tadpole, but inside of the shell goes on the tadpole life, and the frog is born a frog. It becomes a case of embryonic rehearsal of family history. Nature herself without supernatural aid is thus able to adjust circumstances so that in dry regions the frog is born a frog, but in regions abounding in water birth takes place at an earlier point of development; and the rehearsal of heredity takes place by metamorphosis in our fields and pools. This is fortunate for us, because here is evolution going on before our eyes. But, if we are compelled to retain the theory of creation, then we must allow that in the case of the black salamander God made a tadpole with gills in its mother's womb, to breathe in water, although it would never see the water, and would never use the gills. And we must also see that in the case of the ordinary frog there is no explanation for its development through several forms, except that the Divine Being chose to so construct it. And in the case of the axolotl, which breeds in the amphibious state as if it were a perfect creature, or develops, if the season become very dry, into a lung-breathing land creature, we shall have to say appearances go for nothing, because it is already settled that a Creator planned all these things, and made the adjustments. But to one who has not irrevocably settled the matter beforehand, it looks as if these were cases of descent and adaptation.

The illustrations I have given are not strange oddities merely, but in all directions life moves forward on this line of development. That which we call metamorphosis, or change of form, is not strictly metamorphosis at all—it is development. There is every moment going on in the tadpole an approach to the frog. The apparent change is simply the close of one period of change. There is a host of creatures that make their first appearance in the world as nauplii. The transformations they go through with are wonderfully curious; then they come out as water-fleas, barnacles, shrimps, or some other fully developed form. A minute study shows that this is all the result of adaptation of an ancestral form, the original nauplius, to a great many changes of environment.

But as any one of these changes becomes complete—as, for instance, when a tadpole at last makes his first jump as a frog—a great many things are involved. And now I want you to think over this point somewhat carefully, because in it lies the kernel of evolution. All this development by imperceptible change, and by startling change, is a progress from the simple to the complex. New adaptations give rise to new adjustments all around. The tadpole that originally was compelled to adapt itself to amphibious life was compelled to breathe air. That change involved a great many more. Consider, if you will, any act you can possibly perform, however simple in its nature. How complex it is in results! Strike a blow with this book on this desk; you do vastly more than simply strike a blow. You liberate heat and electricity. You cause sound-waves. You startle a series of thoughts, and awaken memories in those who hear.

"All the world hung upon
A word of great Napoleon."

A little invention that you can carry in your hand revolutionizes society and quadruples the comforts of mankind. Now evolution breaks the tendency to simply repeat the structure and habits of progenitors. There is a tendency to slightly vary. The varying involves and compels more varying. To vary is the blow or shock that starts up so many forces. Heredity alone would produce a motion on a fixed line or lines. But one change of environments involves a perpetual and eternal change. Development once begun must go on. The Greek philosophers sometimes called the world "A Becoming." Creation is a process, not a fact. The lower down you go the more plastic to change are all creatures, but the higher up you go the more complex the changes. For instance, an ammonite was very susceptible to modification, but each modification involved but little; it was still an ammonite, with only a different twist. Man is less easily modified, but any change whatever involves not only his body, but his intelligence, his morals, and the whole world that he rules—even the face of Nature. Consider what a universe of historical, social, and moral changes have followed the nailing up of Luther's theses on the cathedral door. Think what is involved in bringing to our shores an Irish bog-cutter. What in a thousand years could not be done by pope and prelate in Ireland is done here in a few months by widened mental environments. Structures abject and brutish, in the next generation rise up to dignity; and with the body stands up the soul. This is the law of development. The world is gloriously full of its illustrations.

I shall close this lecture by showing you how Nature, as if to clinch the argument, often leaps back in her forms; or, as we say, reverts. This is when the power of heredity is stronger than the environments. I had a flock of Plymouth Rock fowls. Most of them have black chickens. One progenitor of this breed is the Black Java, and heredity is very strong to carry the whole stock back to an original type. The environments to sustain the new strain must be carefully looked after. I told you in a previous lecture of the difficulty I meet in fixing any one of several hundred cross-bred beans so that they shall not either revert, or the environments produce new crosses.

When we find a child born with the features of a grandfather, or some of his peculiarities, we say it is a case where heredity draws so strongly as to make the individual revert. A lady met me in your streets the other day who had serious trouble with her boy. I said, "Why don't you whip the rogue?" She replied, with great wisdom, "Would you have me try to whip his grandfather?" He has inherited a propensity; it is not free choice. This was a case of mental reversion. And in modern morals there is no more important consideration than this of heredity. No one can begin to comprehend his duty as a reformer, a parent, or a teacher, who does not comprehend the power of the mind and manners to jump back to an ancestral copy. The evil and the good in us is ours; but it is often a sharply outlined copy from our parents.

Our structures are in reality always so strongly subject to the family bias that more or less of reversion occurs. The strongly marked cases are the result of heredity itself creating environments. I have a friend whose hands and feet are composed of flaps, somewhat like those of a seal. A sac incloses a rudiment of a hand, and with this he writes and works, and has achieved a high position. This is an inheritance of several generations, and belongs to other lateral members of the family. Environment does not easily get rid of such cases, because a malformation is itself an ever-present influence. But reversion proper is wider than common inheritance. It is leaping over one, two, or many generations. A case of double womb occurring in an animal of high rank is a leap as far back as the beginning of the mammals. The very first of the milk-givers gave birth to their young prematurely, placing them thereafter in an external womb, or pouch. The young of a kangaroo, when it leaves the internal womb, is only about an inch long, and resembles a worm; but in the external womb it is slowly developed and nourished till able to go alone. This double womb occasionally occurs in a creature of much higher rank. Nor is the occasional appearance of tails in human beings anything but reversion of type. The heredity is in all of us that includes the animal tail, as well as other structural parts aborted. As a rule, these possible appendages are rehearsed and left behind in the embryo development; but occasionally they are not dropped at all but cling to us through adult life. The law is verifiable, however, that every variation from the normal human type is a variation toward some preceding animal form—no abnormality is ever a pure freak toward a new sort of organic appendage. For instance, a muscle occasionally occurs reaching from the hip-bone to the abdomen; it is the muscle which constitutes the second, external, or double womb to which I have referred. Occasionally a rib is adjoined to the neck vertebræ; that is reversion to the bird type. The tail, when it occurs, is a reversion to the monkey type. But no variation occurs which is not a reversion.

If the believer in special creations answers that a power exists in Nature to create new organs, and therefore these are not cases of reversion at all, he thereby allows to Nature creative power of a very direct and wonderful sort — so much so that he destroys the argument for any Final Cause; for if Nature can make one organ she can make two, or more, and by parity of reasoning a whole creature. Of course, the antagonists of evolution can take as often as they like their stand at the cross-road of species, and aver that all this interchange of structure goes on within certain limits—that it never crosses the line of species. It is, however, a merely imaginary line, established arbitrarily, and there are abundant reasons for believing that practically there are no such limits and bounds, as I have before explained. Mr. Darwin found among his pigeons cases of reversal that connected his nestlings with a type that certainly went out of existence as long ago as 1676, over two hundred years. Not long since a gentleman, now in this audience, related to me a case of a two-toed horse. This was atavism or reversion, connecting the creature with the pre-historic ancestor, of the Tertiary period, that was normally two-toed. The last point at which the inheritance of the horse was fastened was the foot; and from that point it most readily reverts.

I have said enough of the bearing of this topic of development and reversion to show you its bearing on our condition as rational and responsible creatures. Evolution furnishes a basis for morals as wide as the history of life itself. From it must follow not a collapse of our moral sentiment, and a degradation of worship, but an elevation of the ideal to be worshiped; and a nobler conception of what we ought to be, and to do. We are all interlinked in origin, in life, in destiny. The end of morality is not a selfish paradise, but that heaven that consists in ennobling and helping the damned. The eye that can weep over a neighbor's sorrow has been at last evolved, but with it has been developed the hand that can help to relieve his burden. So Nature emerges from her lowly state, and, seated on a throne in the human brain, bids us

> "Work out the beast, and let the ape and tiger die."

Unfortunately, atavism is neither rare nor difficult, and our social life is seriously burdened with it.

LECTURE VII.

THE POWER OF MIMICRY.

WALKING through the edge of my aftermath the other day, I came upon a little brown game hen who had stolen a nest by the side of a huge bunch of tufted grass. I had hunted for her, and probably seen her before, but this time she did not deceive me. Motionless she sat, with only those sharp eyes intent on me. Her brown color fitted admirably to the brown soil and grass, and to it she pressed close, leaving the green tufts to wave over her. I went carefully close to her and touched her, when she noiselessly slid away into the taller cover. It was a case of conscious protection by imitation. The hen knew that a motion would betray her, and made none. It is clear that among wild fowl those that are most like in color to their surroundings will be most sure to escape their enemies and propagate their families. Did you ever find a bobolink's nest? If you have, you know how exactly the little lady fits to the nest and its surroundings in color, while the gay partner sails away in bright colors, that on the nest would be detected at once. This you will find to be a universal fact, to be observed readily in any direction, that birds liable to be preyed upon are inconspicuous in the female sex; while those that are fearless and predatory, like crows, do not vary in the color of the sexes. The crow has no reason for ever concealing itself, for its food is mostly dead matter, and it is itself not sought for food. The law of selective coloring could never work in such a case. On the other hand, the color of male birds that are preyed on is determined by the very different law of sexual selection. Comparatively safe from enemies, the male that is most beautiful is most likely to secure a partner and establish the tendency to beauty in the male line. Partridges, quails, ground birds are, however, in both sexes imitative of the soil and dry foliage and sticks. This is true of fowls that lead about their young. The wild male turkey can conceal himself at will, or strut in gay attire. The prominent characteristic of Nature is variation in color. This is what we first see. The life that moves through natural scenery, coming under this law of preservation by likeness, must establish a very general tendency to imitation. This is well understood by the creatures so preserved; and they add to their safety by determinative imitation. The mother bird sits moveless on her nest until you are quite dangerously close, when she springs downward through the bushes to another point of concealment, while the male flits overhead threateningly.

Every practical horticulturist knows the imitative faculty of those insects that he desires to destroy as depredators. The plum curculio at your approach rolls up its limbs to look like an aborted bud, and falls to the ground. In color and shape it is a bit of cherry or plum wood. The stink-bug that destroys the squash-vines is exactly the color, not of ordinary soil, but of that dark-brown soil which vines love; and he takes care not to stir until flight seems to be a more sure protection than imitation. The striped squash-bug, on the contrary, trusts to either his quick wing or to burrowing. He is alert, and scarcely allows you to approach before he is gone.

You have probably seen a mantis, or "walking-stick," get up from a limb of brown linden-wood and move off, so marvelously like a dry twig that you had not distinguished it until it stalked away. There is also a cricket which so closely resembles a leaf that it has obtained the title "walking-leaf." In form and color it is to ordinary observation a real leaf. Perhaps you have hunted for a tree-toad when sending out his loud notes persistently, yet found it exceedingly difficult to locate him. If you get your eyes on him, unless accustomed to act as detective in Nature, you will not see him. With him, as with the cicadas, it is the sound that misleads you, as well as the color, form, and imitative instinct of the creature. There is a great deal of ventriloquism in Nature. Try to hunt the common house-cricket, and you will soon be quite sure there are five or six, and you can find none of them.

I remember well my first acquaintance with an ichneumon-fly, and how thoroughly I was deceived by its peculiar form—supposing it to be a wasp. But, seeing it penetrate a web of worms, where it was evidently engaged in depositing eggs in the worms, the reason of its wasp-like form was apparent. Like some other flies that resemble bees, its safety depended largely on dread of its supposed sting. Green flies, as a rule, feed on carrion which is naturally to be found in the green fields. The common aphis that feeds on foliage is also green, while another variety finds its protection by exactly resembling a tiny bit of cotton or catkin, floating in the air, or lodged on a twig. On your mossy-twigged currant and gooseberry bushes you have doubtless seen tiny creatures, which you had supposed to be bits of the moss or wood, suddenly show independent life. Others resemble mildew or fungus. If you have not seen this universal imitativeness, you need spend but a few moments any summer day to find it in any direction you choose to look for it. I do not know any section of living creatures, from the smallest to the largest, which is not possessed of it. Creatures that are supposed to pretend death are, in most cases—possibly in all—simply imitating the lifeless forms about them. The hedgehog has the double protection of a spiny coat and simulation. If in any case the purpose of the animal is to pretend death, it is because its enemies are those that do not eat what they do not themselves kill.

In cold climates animals and birds are mostly white, like the snow and ice, but in tropical lands they are the color of the bright flowers and foliage, and in deserts they are almost invariably sand-color. The stripes of the tiger marvelously play in with the flashes of light and shade in his jungles, where dry grasses are played on by a burning sun. Wild cattle and horses are all more or less possessed of this same protection; but our domestic animals pass out from under the law of preservation by imitation, and are selected very possibly for precisely the opposite reason of odd and bright colors. In our barnyards we establish breeds by marks wholly unknown in the wild state.

Insects that sting, birds of prey that are not themselves preyed upon, creatures possessed of offensive odors, and all others that have special means of easy defense, do not need the protection of imitative colors, and have never secured it. Mice, however, and other burrowing rodents, are so generally the subject of slaughter that they are possessed of all available protection; not only being able quickly to hide, but to conceal themselves by their resemblance to dry grass and to the soil.

Our own butterflies are tolerably safe owing to their methods of flight, which is of a zigzag sort, quite puzzling to their pursuers. Yet it is among butterflies that we find the power of mimicry most wonderfully developed. Wallace, in his delightful book, "The Malay Archipelago," tells us he found an Indian butterfly which was the most perfect imitator or imitation he had ever discovered; and I do not think he has since recorded anything more admirable. On the wing it exhibited exceedingly gaudy spots with broad bands of orange on blue ground; but the moment it touched a twig its wings folded back together, and the points came to a sharp apex, precisely as in a leaf. Then from that apex, down through the middle of the wings, ran midribs with branches, as are also found in leaves. The color of the wing thus turned up was invariably that of a dry leaf. So in shape, in marks, in color, the butterfly had turned into a leaf. The head meanwhile had been drawn back and hidden between the wings. This butterfly frequents dry forests, where dry or decaying leaves are not uncommon. When it flies it is with great speed, darting as all butterflies do in a protective manner peculiar to themselves. Wallace says he often saw one fly into a bush, but sought in vain to find it; when lo! a leaf right under his eyes would rise up and dart away. During repose the little tails of its hindmost wings reach down to a limb, and look exactly like the stem of the leaf which it has so nicely mimicked.

These instances from far away are sometimes quoted as remarkable. They are so only to careless observers, for every bush in our gardens or on our lawns, at any time of day, will give you abundant cases of imitative power. I not unfrequently see from five to twelve humming-birds at a time in my lilac-bushes, but I have never been able to find but two nests in my life. This bird relies in flight on its incessant and swift motion, but its little nest is only a tiny bit of moss, and limb-like in appearance. Our trees are covered with worms that imitate leaf-stalks. All the so-called measuring-worms are pretenders. You have no doubt often picked a bit of moss or stick while strolling about, and been amazed to find the thing alive.

I am not so certain how entirely the adornment of nests may be laid to esthetic taste. Certainly birds do admire beautiful things, and so I believe do insects, notwithstanding high authority to the contrary; but I am sure that in some degree the adorning of nests serves to protect them. Dr. Abbott placed a bunch of pieces of different colored yarns near a partly built nest of an oriole. The red and yellow strands were purposely placed most conspicuous; but invariably these colors were avoided by the birds, who took only the gray strands, until the nest was nearly done, when they wove in a few purple and blue—not a red, yellow, or green thread was used. He argued that they realized that the bright-colored yarn would make their nest more conspicuous. The final use, however, of a few blue and purple yarns may have been a matter of esthetic taste, used by way of adornment. Yet this selection of properly colored material is so common among birds that its protective purpose is evident. A catbird's nest is built in thickets, and the sticks used are precisely such as best conceal it, being such as a bramble or thorn bush abounds in. Its cousin, the robin, uses mud, which, so far as color is concerned, fairly resembles the limb or rail on which it builds. But the robin is a clumsy fellow at best, and realizes that his safety is dependent on the protective neighborhood of man.

Understanding the twofold nature of mimicry—that it is partly a matter of choice, purely purposive and conscious, and partly a result of the law that the best concealed survive and hand on their peculiarities to descendants—we see that the two methods also combine their power to protect. The chameleon has an inherited similarity to the color of the limb on which it rests; but it has besides the free choice to imitate at will diverse colors. This is done by expanding different color cells. Caterpillars passing into the chrysalis stage, says Wallace, sometimes spin a dusky-red cocoon when on a brick wall, a green one when on a twig, a white one on a fence-paling. Whether this is consciously purposive, or dependent on external causes that we do not understand, I am doubtful.

This general tendency to establish safety by mimicry works in the sea as generally as on the land. Indeed, the origin of mimicry altogether dates anterior to the emergence of life from the waters. Prof. Osborne describes most delightfully how yellow-shelled snails crawl upon yellow corals, but put into an aquarium with red coral they refuse to approach it. Finding coral of a deep rose-color, the question arose, Is there a snail specially colored for this also? Sure enough, on examination, "there was found a large number nicely imitating the colors of their pink host." Confined in aquariums, snails of each color sought their own corals to creep over—red to red, rose to rose, yellow to yellow.

In the vegetable kingdom mimicry is quite as common as in the animal; and I am specially desirous that you shall see that it is not the exception, but the rule. It is not a few freaks and oddities that we study, but the great commonalty of life. It is a law that has governed every creature that is weak, that it has evolved some method of protection, and in almost all cases a power of mimicry. Turn now the case squarely about, and you will find that the flowers and fruits are mimics of the insects and butterflies. In this case, of course, we shall not expect to find conscious imitation, yet I am not sure but we shall find something very little short of that. Night-hunting moths are guided almost wholly by scent, therefore night flowers are intensely odoriferous. That is, flowers that are sweetest at night draw the most moths, and you know that honeysuckles, jessamines, wax-plants, and other flowers are wonderfully more intense in fragrance after nightfall. You may have wondered why. Watch the insects, and you will soon observe why; it is simply to get the insects to carry on for them the work of cross-fertilization. Moths carry pollen from flower to flower and from plant to plant, thereby doing the larger part of the work of rendering them fertile and fruit-bearing. Butterflies and bees hunt by day, and the butterflies wait on the gay flowers because they follow sight; bees follow smell, and work among inconspicuous flowers. Moths attending the more highly-scented flowers tend to propagate those sorts. The butterflies, liking color, attend to the improvement and increase of bright colors in nature. If a peculiarly rich color occurs as a slight variation it is sure to get the advantage in propagation. Night flowers have, therefore, nearly all become white or yellow, while day flowers run up to the brightest crimsons, scarlets, and blues. Well, you say, this is all possibly true, but in what consists the mimicry? In this fact, that flowers dependent on bees and moths and butterflies imitate the colors of the creatures they need; while flowers that are fertilized by the wind have no conspicuous petals—often no petals at all. This is the case with many of our forest trees. But, as the honey-bee working by day follows scent like a moth, most of our honey-making flowers are white or yellow, like clover and linden blossoms. Here you see a fine adaptation of the imitative sort has grown up between inanimate nature and animate; and you see how the work must continue, and the co-operative adjustment increase. The animal kingdom and the vegetable depend on each other.

If you study fruits, you come to facts of the same sort. Berries, as well as larger fruits, have an object in their respective colors. Their first object in life is to live—like your own—and to propagate the race. How shall they do this better than by being eaten by birds or animals, and being sowed in the excrement of their eaters all over the land? This is certainly the way that strawberries and blackberries are multiplied, while the pears, apples, and cherries are distributed by the fruit-eating birds and animals over the open lands and pastures in great profusion. Red raspberries, however, when ripe, so closely resemble the condition of unripe black ones, that they are eaten far less frequently, and rely for multiplication on suckering from the roots. The whole rose family is a favorite with birds, with few exceptions; and the fruits of the family, including nearly all our berries, as well as cherries, apples, pears, plums, are quite conspicuous and attractive. That is, those fruits and berries that have proved edible and pleasant have had the best chance to propagate by being winsome to the birds and beasts.

But once in a while we catch Nature in doubt, just as we sometimes stand at a fork in the roads doubtful which road will take us most certainly to our destination. The pear is liked very much by two sorts of creatures—the squirrels and other rodents, on one side, and the cattle and fruit-eating birds on the other. But the squirrels will eat the seeds and throw away the pears, so they will never get planted by such creatures; while the cows and birds, unable to digest the seeds, do excellent work in distributing them. Now, if pears are high-colored the squirrels will see them, and so they will get their seeds spoiled; but if they are not high-colored the birds will not see them, and the cows will miss them, and so they will not get their seeds distributed and planted. Here is a puzzle for Nature, and she has never quite decided how to solve it, for some of the pears are very high-colored and some are very dull. But this is what she has done: the dull ones are colored very much like leaves, so that if you try ever so hard to pick a tree clean you will not be able to do it. Here, then, is mimicry working both ways—one way to identify fruit and leaves, and so hide from squirrels; another way to color the fruit to attract the birds, and so get eaten by them. For the same reason she keeps her unripe fruit green—that is, the same color as the leaves—thereby concealing it; for, if the fruit is eaten while green, the seeds will go to waste and the family die out, while the only bright fruit is ripe fruit that contains seeds ready to be planted.

The whole story, then, is this, that by a very slow process of adaptation to surroundings all the superb colors in fruits and flowers are produced. The flowers get the colors of their animate friends, and their animate friends grow to be like the flowers. In South America, Orton assures us that there is not a butterfly in the Amazon Valley, which teems with such forms, that has not its correspondent flower; nor a flower that has not its correspondent butterfly. Orchids are remarkable for this mimicry. Hanging on trees, they and the insects about them are alike varied and beautiful. So much do the birds and the orchids resemble each other, that if the former be perched beside the latter it is not possible to tell which is the animate and which the inanimate. The most beautiful bugs and birds hold intercourse, as a rule, with the most lovely flowers. The fraternity is larger than the acquired faculty of imitation. Out of this association rise the manifold mimickings. You would hardly imagine from their colors that the chimney-swallow, or dart, and the humming-bird are cousins, yet so they are; and each one has become closely associated in appearance with its chosen surroundings.

From the standpoint of special creations you can make nothing of these mimicries except whims on the part of the Maker—his mere fancies. Evolution affirms that they are the result of natural selection. In the very general diversity of color and form a slight likeness arises between one or more butterflies and the mosses, or leaves, where they feed. As a consequence those butterflies escape the birds, while others are devoured. This destruction of those lacking the similarity, and preservation of those possessing it, establishes a tendency toward such likeness in succeeding generations. How far such an established drift may carry a species can not be limited. The same thinning-out process will go on generation after generation—each time the best concealed being preserved. The mimicry, at first slight, will necessarily increase to a degree practically sufficient for the end in view. No one supposes this to be a conscious aim on the part of the creature or the plant. Although we say the object of the bird is to attract the butterfly, or the object of the fruit is to avoid the birds, this is only a figure of speech; but now we must add to this unconscious tendency to imitation the conscious instinct of self-preservation. The insect or animal in time learns to take advantage of its acquired peculiarity, and so uses it as to increase its immunity.

So far as imitation is a result of a mere coincidence, the same likeness may grow up between two species or genera of plants; and so it happens, yet I think rarely. Wallace speaks of certain non-poisonous fungi that find protection by growing with and being like other and poisonous sorts. In one form or another Nature is charged everywhere with the idea of escape and self-preservation. What in us becomes a powerful instinct for what we call salvation is fairly inherited by us from life's lowest forms. We also have, even in our highest spiritual conceptions, a power over us waiting to destroy us. By a scheme of substituting another's righteousness for our own we expect to appear in his likeness, and so be preserved from all harm. We take the colors of the power that can not be assaulted and overcome. This is the mimicry of self-preservation carried into the realm of what we call the spirit. Meanwhile, those that refuse to hide in accordance with the redeeming plan are lost. Among lower creatures those that least assimilate to environments are destroyed. But I am inclined to believe that as moral beings the assimilation required is that of character. He is most safe who becomes most like the supreme Good.

But it is not simply at the height of rational existence that this impulse for self-preservation responds to the mimicry of lower life. You will observe its operation in our social customs and common propensities; for it is a fact that not anything is more dreaded or shunned by average human beings than originality—that is, unlikeness to others. It has always been dangerous. It is even yet likely to secure for its possessor a great deal of annoyance. We are, therefore, inclined to hide ourselves in common custom, common beliefs, and, as far as possible, we lose ourselves in the party, sect, or crowd. You can make nothing else of the horror of heresy, and the storm of indignation that meets a break from current philosophy, theology, or medical practice, but a human instinct for self-preservation. We are compelled to copy each other to avoid malice and gossip. Closely associated with this propensity to protect ourselves by imitation is the universality of the sentiment of fear. Only by the supremest power of reason do we overcome an instinctive terror of individual separation from others; a fear inherited from the whole realm below us.

When we have fully grasped the fact that mimicry is a universal law or tendency, and does not simply cover a few curious cases in Nature, we shall hardly be able to escape the conviction that it is an evolutionary tendency, and not the result of a creative fiat. There is no evidence of any other God being present in these operations of Nature than the omnipresent intelligence, or something broader, higher, fuller than intelligence, that fills Nature every moment. Unintelligent Nature is undiscoverable. Intelligence there is, and purpose, but it is not a purpose that does not run unbroken through the whole of space and all of time. You do not need that I shall remind you that I do not suppose that life and all the curious phenomena of life are explained by simply saying Nature does it, or it is a law of Nature. Who or what is Nature? While mimicry plainly argues against a Designer who set the world in order, that which is involved in mimicry is evidently a universal life. In my judgment it is as impossible to conceive of Nature apart from universal mind as it is to conceive a mind apart from Nature. We, and all about us, are palpably not the designs of a designer who is alien to us, but of a power of which we ourselves partake. I can not comprehend the subtle unifying power which is really the essential myself. Neither do I clearly grasp the unifying purpose and potency in all the cosmos; but as I am clearly a unit, a self, an undivided substantiality, so there clearly is a unity involving all that was, that is, or will be—for you can not conceive consequences that are not contained in causes. So, when we speak of Nature, of which these birds, bees, butterflies, walking-sticks, and flowers are fragments, it is plain that they are parts not only of a material unity, but of a unity of another sort—a unity in which is involved intelligent will, or something which is both intelligence and larger than intelligence, of which intelligence is a phenomenon; which covers a gamut in which intelligence above, and sensation below, are but upper and lower chords of a divine harmony—an infinite Unity blending into Moral Purpose.

LECTURE VIII.

DEGENERATION.

EVOLUTION shows us that from the beginnings of life on the earth there has been a general tendency from the lower to the higher in the way of organism and function. In higher evolution, progress in the organic form has also involved advance in cunning and wit. There has been a steady elimination of small brains and dull brains in favor of large brains and fine ones. The horse is a bigger-brained creature than its two-toed or its three-toed ancestor. But think how long it took Nature to carry out her purpose of building a horse. It was not done in a day, or in an age. It was in process through the whole of the Tertiary period, or at least five millions of years.

It need not surprise us that meanwhile some forms, and probably many, not only failed of sustaining themselves in any line of development, but have either dropped out, or have taken aberrant courses, degenerating in form and habits. The non-fittest have not in all cases failed to survive.

Hugh Miller undertook to construct paleontology on the theory that each creative day, six in number, began with the placing on the earth of fresh and perfectly formed creatures; but that each day closed with such types deteriorated into deformity. I need not say that Mr. Miller's anxiety to make geology and Moses tell the same story, in the same way, led him astray. There is no such record of life-history, except in the imagination of the religious enthusiast; still the fact of degeneration in evolution can not be overlooked. This is the result of either unfavoring conditions, leading to the retardation of growth of vital parts of the organism, or of those conditions that favor a lack of effect and use. Growth, in the way of progressive evolution, depends on the struggle for existence, requiring the constant effort to attain powers, and thus the systematic use of attained powers. But when non-use sets in, not only are the organs lost, but the functional tendency is lost. A fish in a cavern first loses sight, then the purposive effort that led to organic vision and sustained it, and finally the organ of vision itself. In other words, that potency and effort which first led to the eye is no longer put forth, and the creature is so far degenerating. I shall most readily illustrate this lecture from human analogy, and shall therefore so use our knowledge of human actions and character as to throw a light on cases analogous and parallel.

The first condition of degeneration is not reversion, but perversion of aim. The evil man does not go back on the line of his animal heredity, but turns aside into paths that are neither human nor animal. The physical structure that ceases to make progress oscillates for a time about a point, and then moves off toward some degraded condition. Here its existence depends on environments that favor its degraded nature. If afterward these are removed, it can not readjust itself to higher purpose, but must perish in its shame. The law of life is progress; the law of degeneration is ultimate elimination. This law again is precisely parallel to the higher law that governs moral life; the gift of God is eternal living, but the wages of sin is death. So you see that in the vast differencing of forces it grows more and more probable that there shall be a temporary survival of the unfit. The cunning that takes advantage of circumstances, discovers methods of subsist-ing on others, and so becomes attached in the way of a parasite.

Nowhere in nature has there been as much parasitic life as among human beings. It takes a large degree of wit to live idly, and off your neighbor's industry. But some vegetables learned to do this before man did it; and many animals have done the same. The result has been degeneration, loss of structure, loss of faculty, and, as a rule, final helplessness and degeneration of the whole being. The comparison is very striking between a human hanger-on and a parasitic creature, that all his life clings to some other organism, sucking the life out of it. You never saw such a person who did not lose self-respect, manly features, sound judgment, and ability to exercise his remaining faculties to advantage. The man and the insect are alike fitted to less complex relations in life.

The hermit-crab is one of the best-known instances of degeneration. It has adopted the plan of seizing upon the cast-off shell of some other creature, or driving out a weaker neighbor to secure his domicile. It has now lost the power belonging to all the crab family to develop a shell; only over its abdominal parts there is the thin vestige of what should be such a covering. Then, to fit it to its stolen residence, its fourth and fifth pairs of limbs are aborted, and its tail is drawn out a bit.

But the hermit-crab is itself in turn infested with a parasite. This creature, when born, is an active reputable animal having three pairs of legs, one eye, and no mouth. By and by it develops a shell, then it loses two legs, and gets six pairs of swimming feet. Its fore-legs grow into long suckers with which it intends to begin its bad practices. As soon as possible it attaches these organs to the hermit-crab. Then it kicks off its swimming feet, and the body swells out into a baggy shape, a perfect picture of a lazy-belly that is living off society, and cares only to eat and to drink. The family of which this creature is a member has some reputable individuals, industrious and progressive; yet, on the whole, the family is itself an instance of degeneracy. Another member is the ordinary ship barnacle. It has less excuse than sacculina, for it begins life with more promise. Darwin speaks of it as having two magnificent eyes in its second stage of growth; but it uses all its powers to secure an easy spot. This it finds after a while, and then its big eyes grow dull, and finally go out. Henceforth it is simply hanging on somewhere, and swallowing.

The stylops are small, active, six-legged creatures, that inhabit the bodies of bees. As soon as convenient, they bore their way into young bees. Here they shed their skins, and become grubs. After a while the male emerges, and, developing wings, becomes active once more. The female stays behind, and, as a mere sac, keeps up the business of laying eggs. There are other cases of parasites where it is the male that refuses to work, leaving the female to support the family. The barnacle is an instance of degeneration from immobility. He sits down, waiting for something to turn up; and, as a result, loses all power to help himself. The stylops is an instance of the sort that occurs so often in human life where marriage is not a match. In parasitism, degeneration takes the forms of shiftlessness and hanging on.

Another very curious form of degeneration follows the tendency that a few creatures have to act precisely as vegetables do, that is, feed on carbon gases. They are green in color like a leaf, and can absorb carbon, and so feed without a stomach. It is, in fact, a most astounding degeneration, reverting in that degree, back of the separating point of the vegetable and animal kingdoms, to where the two kingdoms had common functions.

The general law that governs all these cases is, that "any new set of conditions occurring to any animal, which render its food and safety very easily attained, lead, as a rule, to degeneration, just as an active, healthy man degenerates when he becomes suddenly possessed of a fortune; or as Rome degenerated when possessed of the riches of the ancient world. The habit of parasitism clearly acts on animal organism in this way. Let the parasite habit be formed, and away go legs, eyes, and ears." The old law of Nature is universal, that you must secure food at the expense of work, or else at the expense of faculty. The ascidian, the mollusk, the vegetable, are governed by this law as well as man.

Rudimentary organs, of which I spoke in a previous lecture, are sometimes to be classed as instances of degeneration. Development of an individual is the preservation and strengthening of its higher powers, possibly at the expense of its lower. But the extreme exercise of one or more excellencies may lead to a one-sided development, so that, on the whole, there may be vital degeneration. The birds that have taken to running have no true wings left, only rudiments, and no longer can fly, if they will. It is not impossible that such a partial loss may be in the way of average gain, so that, in reality, no degeneration results. In the case of the huge birds, such as the ostrich, the average loss is real; but in our barn fowl the adaptation to domestic life is progressive development.

Squirrels, in countries devoid of trees, burrow, and lose the power to climb. The rodents, and all burrowers, are of a low order, evidently in consequence of their betaking themselves to an underground existence. Red ants have degenerated, owing to the habit of keeping slaves. Another species is so entirely dependent on their black servitors that they have lost the power to build, or even to feed themselves. How astonishingly in contrast are such ants to those we see building well-avenued towns, with paved streets, and keeping domesticated creatures, from whom they obtain a supply of favorite food!

The growth of a thick coat of wool or hair is qualified by a proportionate withdrawal of energy from the brain. Savage men are well covered with hair. Civilization aborts this covering, although our babes in one stage of the embryo are hairy. Baldness marks the higher races, also a decrease of teeth, although grosser races are tusked. The law is fixed that withdrawal of energy to intenser brain action leads to decay in other directions. The overtaxed brains of our children leave the teeth deficient in nutrition. But the natives of some of the West India islands crack cocoanuts with their teeth.

All dynasties of animals that during past ages have disappeared, have gone out in two directions: The selective power of Nature has differenced from them races possessed of their better powers, leaving, as degenerative relics, other races, sooner or later to perish. From the saurians come snakes and birds. Snakes are created by a process of degeneration; birds by a process of development. The snakes have lost in all respects, except the articulation of the vertebræ. This gain partly compensates the loss of feet and legs. They took to crawling on their bellies, and thereby lost their feet, while gaining the abhorrence of all other creatures. The tortoises lost in the size of the eye, and in eyelids. But the birds, also of saurian ancestry are, with few exceptions, moving on an ascending line. Their brains are very large, and their locomotion is unequaled. Next to man, the brain of the bird is most actively controlling. Birds know better than to rear their broods in southern climes; but for safety they spend their winters there. Men and birds are the only cosmopolitans.

Very reasonably we should expect many creatures to remain through many generations very nearly stationary. Shell-fish, snails for instance, got out of the water, but there they stopped.

Instances of degeneration are found with equal readiness in the vegetable kingdom. The dodder begins an independent career with roots of its own; but it soon fastens on some adjacent plant, and, having secured itself in that position, gives up its roots, and lives on its friend's toil. The mistletoe never touches the soil at all, but, too dainty for dirt, fastens its seed on an oak, and there spends its whole life. All fungous growth is devitalizing to the tree on which it is fastened; but on that account the fungi may not of necessity be degenerating.

A large proportion of the vilest weeds that overrun our agricultural lands, and spread with such eagerness their atrocious and barbarous species, to contest with us the occupancy of the soil, are degenerate forms of nobler families. They find no rivals capable of contesting the world with them but the insect tribes. Man and the birds and the cattle serve only as aids in their dissemination. Most of the vilest weeds have crossed the oceans, and railroaded it across continents, in the fleeces of sheep, or mixed with our cereals, or borne by birds. They are an unpleasant set of interlopers, ill-scented, without beauty, and a pest to agriculture. It is not consoling to know that their degeneration has not gone so far as to point toward extermination. The vigor of their grip is owing to man's presence; their extermination will tax all his energy and wit. The only power of these weeds is to develop a rougher, more prickly, more sticking set of descendants; for the vilest, illest-favored, and illest-flavored are the very ones that are most shunned by animals, and are therefore most likely to propagate themselves. Like stinking insects, their power to survive is in their ability to grow more nauseating.

But in the larger sense, and fuller, the whole vegetable kingdom must be looked on as a vast instance of degeneration. Biologists, like Cope, assure us that since the animal and vegetable kingdoms are but a twofold form of a common primitive life—two branchings of original cellular existence—they must be conceived as originally possessed of a common sensation. The animal branch moved on from sensation to consciousness of a higher order, and in one branch to self-consciousness; but in the vegetable branch conscious purpose is lapsed into unconscious tendency. Sensibility is still retained, and in some cases a sort of semi-consciousness. Every plant knows how to do wonderful things, and how to adapt itself to changed environments; it also knows better than to undertake other things. But the plant does not know what it knows. Its whole mechanical energy is on the plane of part of our own—the purely automatic.

With man's enormous increase of power for progression, you will naturally look for a vast increase also of individual, if not collective, instances of degeneration. The increase of wit or cunning has in him become intellectual power, and intellectual power involves moral conscience, or con-science; and conscience involves responsibility, and responsibility involves guilt, so that at last evolution discovers the terrible moral slough of sin, in which so many are forever lost. The race, or the individual, that degenerates is responsible therefor; and so intensely conscious are we of this that there is nothing so terrible as the lash of regret and remorse. Nor is there any other so effective preventive that can be applied to halting human nature as the fact that it can permanently, hopelessly, drop out of position, lose itself in deteriorated form and power, and even pass on this condition of lapsed humanity to children. It is a sad illustration of the tendency of our institutions to degenerate, that religion seldom makes use of this innate motive; that, indeed, it has no faith in an appeal to the man in us, but more in the threat of the vengeance of a Creator, and the system of extra-natural torture he is supposed to have devised for the disobedient. Religion does not make its first object to prevent degeneration of character, but, denouncing us as hopelessly degenerate by inheritance, it seeks to save a few by the process of parasitism. We are to denounce human nature, and cling to Jesus.

The principle is inherently evil, but the results are not always disastrous, for parasitism involves on the other side the superb moral power of altruism. So by the divine energy of one many are lifted—many to possibilities they would not attain alone. "I will eat no meat," says Paul, "while the world stands, if it make my brother to sin." The larger part of men are moral parasites; yet they are moral. If left to their own unaided aims, they would fall far short. The hermit-crab is not better off for giving up the habit of building his own house, but if he has lost the faculty the best thing he can do is to house himself in the casement of his neighbor. Altruism is thus brought to the front, and mankind worship it in Jesus, and in Buddha; although, as a rule, it ends in a cross for the great heart that bears. The world holds few independent moral choosers; most act on the judgment of others, or follow inherited custom. Intellectual parasitism is of the same sort, since most educated persons are educated only to the extent of adopting other people's opinions.

That all savages are cases of arrested development—that is, are races that have never been above their present condition—is certainly not true. History shows us races of the highest rank reduced to barbarism. The causes have been war, diseases, vices, scarcity of food, and occasionally great natural cataclysms. Earthquakes occurring with frequency inevitably render a section of the earth so insecure that hope and moral courage are destroyed, as well as physical industries. Imagine the effect of a glacial age once more moving irresistibly southward with its grind. Races depressed by war and savage customs go backward in structural type, as well as in intellectual and moral power. They develop animal propensities and brutal physique. I do not mean that they retrograde on the line of their ancestral origin, but that in form and function they are grosser and viler. Many of the races on this continent have certainly degenerated from a higher civilization. No picture of human lapse can be more pitiful than that of some of the tribes of the Southwest. The native Mexican is the degeneracy of two races combined. It is quite probable that the Patagonians are purely cases of primitive undeveloped savagery. Naked, or nearly so, in a frigid climate, without art to build a comfortable hut or a water-proof canoe; without wheat, corn, or other cereals; without the fruits of genial climates; living almost wholly on fish; with a language of purely animal sounds, the adults crying as monkeys, "ama, ama, ama!"—these wretched creatures have no amelioration to their lot, except that they do not know its wretchedness.

Degenerative races rapidly vanish before races of progressive power. For reasons not worth our while to discuss here, the drift of higher races has been mainly westward; and to-day, as in all the past, the empire of mind and hope has followed the sun. Race after race has risen, fallen, and disappeared on this march. The great races have been destroyed as much by their own vices as by the arms of more virile and more virtuous peoples. Very much that takes place under our higher civilizations to-day seems to warn us that finally degeneration will be our own lot. The possibility at least is with us, and the elements are constantly at work that weigh us down and out. We can only hope that the counter-forces of evolutionary progress have accumulated dynamic power to make progress permanent, at least in a few races. It is difficult to read the reports of parasitism, and note the survival of savage instincts in our centers of civilization, and retain faith that degeneration is not finally to win.

I do not mean to suggest that, on the whole, there is not constant gain. Optimism is well founded. Structural life in all the long ages past gained in spite of lapses. Looking at the world during the age of giant saurians, a witness might say you will never on this earth, at this rate, get a bird, or a horse, or a dog—much less a man. But man to-day is studying the bones of these monsters, and considering how, in spite of lapse and waste, the road was never lost, nor the goal forgotten. Out of these very saurians came at last the birds and the true fishes and the higher vertebrates, that led on to the mammals.

Fortunately, degeneration in man is rarely of a sort that establishes an equilibrium between decay and growth, but it is almost invariably retrogressive and self-destructive. It carries not only its disgrace, but its doom. It faces extinction. Sterility is the consequence of sin. "The vices of criminals so disease them that the average death-rate is raised." Extinction in the fourth or fifth generation follows the illegitimate vices that devitalize. Indeed, sin is sin because it destroys. Dr. Thompson, surgeon of a Scottish prison, says: "I have never elsewhere seen such an accumulation of morbid appearances as here in the post-mortem examinations of the prisoners. In every case almost every organ is more or less diseased. Their moral nature seems equally diseased with their physical. Nine out of ten are of inferior intellect, but all are excessively cunning." This picture tells the whole truth. Degeneracy is not an accomplished fact, but a fact that is being accomplished. It is a tendency to total disease of body and mind, although bringing to abnormal development animal cunning. Cunning is an instinct inherited from animal ancestry, that is kept in abeyance by duty and a sense of honor.

The one fact most clearly established by science is the inextricable tangling of moral and physical consequences. Choose the right, do the right, and you not only thereby are ennobling your mind, but your body. Conserve your body wisely, and you are not only making your physical frame more beautiful, but your mind will be also stronger and clearer. Education is being rapidly readjusted to this view of human beings. The body is not an enemy of a something that we call the soul, temporarily its resident, but is in all ways identified with it in righteousness, and in sin.

The mountain quail is so perfect in its imitative adaptiveness that its brain-power is largely aborted. It has become a stupid creature, relying wholly on imitation for protection. This is a constant tendency in nature for conscious effort to drop down into the unconscious. When a function comes to absolute perfection, no further brain attention is given to it, and the creature becomes monotonously automatic. Our own greatest danger is that we shall become mechanically complete, and so functionally automatic, and even largely unconscious. This is the history alike of races and of individuals, men and animals, churches and schools. We have automatism in education, and in religious worship. Circumstances arise that require readjustment; in this the perfect mechanism fails, and degeneration follows. A church perfectly adjusted to the ninth century secures a perfect creed, a perfect inspiration, a perfect scripture, a perfect interpreter, and therefore can not readjust itself to the nineteenth century. The consequence is that in every capacity the church degenerates. The effort to readjust to new demands wrenches it into fragments, incoherent, and feeble.

Civilization really involves serious danger to all evolution. It is sure to give the brain too exclusive control of vital energy. It has been invariably accompanied by a waning of sense-power. Eyes are less keen of vision, ears duller, and the failing of the physical accompaniments of teeth and hair indicate that the brain is gradually making inroads on the vitality of the rest of the body. Civilization also is accompanied by a loss of moral power in special directions. Insurance against fire has largely increased perjury. Subtler safeguards are necessarily devised to check such evils. But, above all, civilization endangers the very evolution that it achieves, by creating a new barbarism in its vast cities and its manufacturing districts. The steady trend of invention is, however, to make the dense bodies of workers more comfortable, and to reverse the conditions of seclusion and ignorance, formerly attached to remote farming districts. We now wait for such further applications of power as shall disintegrate the crowds of our cities, and break up the tendency to live as barnacles on the keel of civilization.

Degeneration of a criminal sort is self-corrective. It is in the long run not a serious item that the bulk of the human race fails to evolve virtue. Baseness overwhelms the base. While the higher classes decrease in fecundity, the lower die so much more speedily, that right steadily gains ground relatively, in the rule of the world. It is true that animal life has never degenerated to the lower levels of human life, but it is also true that this degeneration involves elements of self-elimination.

Abnormal human degeneration I would pass by only for its demonstration of our animal heredity. Dr. Maudsley says that with the appearance of the animal type of brain in idiocy there sometimes appear or reappear remarkable animal traits and impulses. Dr. Carpenter mentions an idiot girl who, being delivered of a child, gnawed the umbilical cord. Dr. Crichton relates a similar case. Dr. Mitchell says: "It is not the face only that is ape-like, but he grins and chatters and screams like a monkey. He puts himself in ape-like attitudes. His thumbs are only fingers. His head is not small, but is conformed to the ape-type." A case was on record recently in England so peculiar as to be termed the missing link. Pinel reports the case of a woman who conformed to the habits and language of the sheep. She expressed dislike by butting with her head. Such cases are evidently not only degeneration, but direct reversion to the animal type. As the embryo rehearses the animal stage the brain seems from some cause to be stopped in its development, and henceforth to act at that point of arrest. From medical authority I learn that in most large asylums there are one or more who literally ruminate like cows. They bolt their food, and then retiring to some quiet corner bring it up again, to chew it more freely before it is digested.

It is a fact, no longer overlooked in dealing with criminals, that very many of them are cases of degeneration to a low physical and moral state, so that their actions are as normal for their states of development as the acts of the most virtuous citizens are for their higher organizations.

The causes of human degeneration, already in part suggested, may be summed up as bad heredity and bad environment. There is one book in the English language that stands pre-eminent as a study of both the causes and cure of degraded life. I refer to "The Jukes." Its author, William Dugdale, has the genius of sympathy. From his carefully tabulated reports I shall give you one instance. In the seventh generation the story begins with an illegitimate girl, whose mother (sixth generation) was an illegitimate prostitute; whose mother (fifth generation) was a harlot; whose mother (fourth generation) was illegitimate, married to a husband whose father (third generation) was illegitimate; whose mother was Ada, a harlot. This is heredity; and a sad story it is. Now for environment. The child is the offspring of an incestuous relation between her mother with her uncle, who had served two terms in State prison. The mother (fifth generation) kept a brothel, and it was no doubt within its atmosphere that the girl was contaminated. Going back to the fourth generation, we find the parents keep a low dram-shop, which also serves on occasion as a house of assignation.

The whole genius of evolution is this, that bad heredity must be met by wise environments, if you would enable its victim to escape from the current. Education should mean nothing else than surrounding the child with influences to improve a good heredity and counteract a bad one. You will not be surprised that Dugdale insists that a change in the environments may produce an entire change in career, which in time will create an actual change in heredity and character. He, therefore, earnestly condemns our reform and prison system, which, instead of changing environments for the better, often change them for the worse. Our whole punitory system is hastening the degeneration of the people. He makes the two most important factors of regeneration to be public health secured by sanitary regulations, and a right moral purpose. The draining of lands, the sewerage of cities, the ventilation of houses, the sanitation of tenements, the cleansing of streets, the widening of thoroughfares, the demolition of rear buildings, the removal of cesspools, the purity of water supplies, the abundance of fresh air, will enable the people to do more work with less exhaustion. This done, they will resort less to stimulants. This will react in favor of temperance in all other directions. Add to this, early education of a sort that establishes in childhood the habit of right doing and right thinking, and you have established regeneration against degeneration. The two factors may be restated as a healthy body and a healthy mind. To this we must come in the place of the false system that neglects both body and mind, and relies on preaching and punishment; that, indeed, does not aim to reform, but only to punish, and to "save" for heaven after a lost life.

The environments that lead to degeneration have in part been enumerated. They may be succinctly classed as—1. Early neglect of the mind, leading to a ready subjection of the character, as inherited, to corrupting influences; this reacting on the body to bring the structure under the power of disease. 2. An overworked body, or brain, or both, such as accrues from factory life, or the worry and fret of our morbid business eagerness. 3. The use of stimulants and narcotics, particularly alcohol and tobacco. "In no case is the sin of the father visited on the children more strikingly than in the case of tobacco smoking. The enervation, the hypochondriasis, hysteria, insanity, dwarfish deformities, consumption, the suffering lives and early deaths of the children of inveterate smokers bear ample testimony to the feebleness and unsoundness of the constitution transmitted by this pernicious habit." On the same authority, alcoholism in all its forms is destructive to sound and enduring health of body and clearness of intellect, as well as moral honesty. Scientific men see this with more and more distinctness. 4. Intercrossing of families. This Nature takes special and curious methods to prevent in the vegetable kingdom, while among domestic animals we recognize the necessity of careful oversight, if we would improve the stock we rear. Darwin hints at the possibility that we may at some future day take as much care in breeding human beings as we now do with horses and dogs. Another eminent writer says: "I look forward to a not distant day when, as the moral tone of society advances, and men rise to larger perceptions of their mutual obligations, the propagation of vitiated constitutions, as well as of positive disease, will be universally condemned as culpable, and possibly prohibited as criminal. Some classes have already reached this rising ground in reference to the three fearful maladies—insanity, leprosy, and cretinism." 5. Overtaxing or intemperate use of any organ or function at the expense of the rest. This includes intemperate sexual indulgence, but is by no means confined to that rapid method of degeneration. The evil is quite as certain after undue exercise of the emotions, or undue moral excitement. Give a boy at twelve or fourteen over to the exciting influence of a revivalist, and you will be likely to find that, while there is produced a sharp turn in his outward conduct, his moral apprehension and sensitiveness to wrong are largely or absolutely destroyed. "Conversion" is often only the bringing to the front of assertiveness, false notions of right and duty, deceit, self-deceit, boldness, and the sending forever to the rear of the higher qualities of modesty, generosity, purity, and childlikeness. No child before conversion was ever known to be willing that his parents or playmates should be forever damned. Degeneration is thus the atrophy of a part. This is liable to occur from overwrought desires and efforts for good. Religious enthusiasts and educational enthusiasts are equally dangerous. Because Jesus did this or that is no reason why a feeble creature should undertake the same task. Jesus was a giant by heredity; a moral pigmy must be contented to grow. 6. Bad nutriment or the use of insufficient and unhealthy food. It is impossible to rear a hungry child in the way of developing a large character or a strong body. Both are starved together. I have seen cases where the penuriousness of parents has brought about a check in the development of children, and after a while a bias to lying and deceit followed. The honest cravings were maltreated, and all possible indulgence must be secured through cunning and concealment. 7. Rigidity of social customs, and institutions of a religious sort that reach a condition of sacred unpliableness, will also work, as I have previously suggested, in the way of degeneration. 8. As use and effort determine evolution, disuse and sterility of purpose work degeneration.

I have now shown you that the hypothesis of evolution is far from affirming an unbroken rise in structure and functional power. It allows for a struggle that in many cases involves failure, in some success; but in long reaches of time establishes a steadily increasing increment of gain.

"Step by step, since time began,
We see the steady gain of man;
For still the new transcends the old
In signs and tokens manifold:
Slaves rise up men; the olive waves,
With roots deep set in battle graves."

In the long run, over millions of failures, and allowing for considerable backsliding, for even wholesale failures, and race failures, and periodic recurrences of degradation of life energies ; in spite of all, evolution has its eyes in its forehead. Progress is made with increasing ratio since reason and morals became factors of life. The history of man creeps on from the brute struggle for existence to the invention of language and of letters in which to express growing intelligence. Speech blossoms in poetry and fruits in philosophy. Knowledge writes itself all over the brain, and then folds it over in new leaves until it looks like a volume from the press of Nature with marginal notes of all the days and generations. Evolution is progress. Evolution is hope. It is the religion of the future.

PART SECOND.

LECTURE I.

COMMON LIFE MATERIAL, APPARATUS, AND FUNCTIONS.

§ 1. *Common Life Material.*

Max Müller asserts that evolution is vulnerable at the two ends—at the beginning of the evolving life, and where it culminates in man. Darwin presupposed life to be already in operation, and undertook no more than to expound the law of its unfoldment into various forms. Yet Darwinism brings us to the very gates, and we are tempted to look through, both to discover the origin and the destiny. Sir William Thompson and Zollner have suggested the possible origin of life on our planet by transference of life-cells, in meteoric or cometic conditions, from some other globe. But this granted—and I believe substantially in fossil form it is true—yet it only shifts the problem, without solving it.

What is the origin of life is answerable in three ways: 1. It is the direct fiat of a supernatural Being. 2. It is the result of mechanical action in pre-existing atoms. 3. It is an eternal potency of the universe.

Those who advocate the mechanical theory urge that organic life is sustained by a mechanical interplay of atoms. What we call living is not a matter of willing, for the most part, but a complex affair that operates precisely as any clock or engine operates. Yet we never can escape the necessity of being wound up. Besides, whatever may be true of our organic parts to-day, it is true that no one of them originally functioned without will. The heart, the lungs, the nutrition, that with us act automatically, with lower creatures are organs under conscious control. There is not an organ of any creature, from the bony plate of a tortoise to the eye of a vertebrate, that does not presuppose a desire, effort, and intent on the part of its possessor, or his ancestors. It is impossible to reduce life to a mechanical process, because there is one factor in all living processes that does not come under the head of mechanism—that is sentience.

We are driven to the conviction that either life originates from a God, or does not originate at all, but is a function of the universe. If we assume the former theory, then either life and substance were created from nothing; or preexisting matter, which originally and eternally was lifeless, was at a given moment endowed with life. The former supposition, if tenable at all, is so enormous that it leaves us utterly helpless in the way of logic; for, if something can come from nothing, our reasoning must end in nothing. If the latter supposition be assumed, it can only be sustained by a failure of the scientist to show that life is a potential quality of the universe. For, between the two, that life is an essential faculty of the universe, and that it is a special endowment of some elemental conditions of the universe, the former theory has this advantage: it really comes to a finality; whereas the latter theory only refers life back to a cause, but does not account for the cause—the origin of life is as obscure as ever. All we know by such a supposition is that life, as we see it, was caused by life as we do not see it.

We are forced toward the position that life is an essential and universal quality of the universe—without origin and without end. That it has beginnings and ends in the way of local phenomena is true, and these are associated with certain material conditions. Consider that our theology has educated us to think of the universe as a dead universe —a very impossible supposition. Originally, we are told, not anything was—only the great universal nothing. Then God created something, but it was a lifeless something. He, the Creator, only had life, and he was not what he had made. Death, or absence of life, therefore, was the primal fact—life the exception. Now, when you reverse this theory, and say life was the primal universal fact, you are for a moment disabled from thinking. The supposition is in accordance with all known facts ; there is not one fact that militates against it in all our sciences, yet it is so simple a solution that we seem deprived of something. The mechanism of creation is what we miss ; the familiarity of the method of referring every hard problem to a God, "with whom all things are possible," and "whose ways are past finding out."

Let us see that the only thing we need never assume is Nature. Can we explain what we see, and are conscious of, by referring it to what we do not see, and are not conscious of ? Nature consists of a consecutive series of causes ; do you gain anything by going back on this line of causes as far as you can, and then saying the farthest link is a Final Link, and that final link is a Final Cause, and does not need to be accounted for ? It caused itself ; it linked itself. Of all absurdities the strangest is that which imagines it finds any explanation of an infinite series, which series excludes from each term self-causation, by supposing a self-caused Cause as the Origin. You have now to account for the self-caused Cause. Why not stop at life as uncaused, instead of assuming an uncaused cause of life ? The evolutionist says life is—it is an ultimate essential fact. The creationist answers life is not an ultimate fact ; it was caused, but its cause is an ultimate fact.

The choice is open to us, and we must adopt the view that gives satisfaction to the demands of reason. I shall not hesitate to accept of the evolution of eternal life as the more rational hypothesis. Why did this universal potency of the universe manifest itself as an active organic potency in a series of phenomena on our globe? Undoubtedly this depended on the presence of those material conditions which enable life to be manifested. The conditions, for our globe at least, are the presence of what we call protoplasm or life-stuff. That these are the conditions everywhere in the universe, for any and all life conditions, is not to be assumed; nor is it at all probable. But on our globe we know life is apparent only in protoplasmic forms. We have no analytic power, microscopic or otherwise, to enable us absolutely to say that some manifestation of life may not be without beginning even here, but we can only trace life back to what seems to be a beginning in a protoplasmic cell; although the rhizopods are in some sense precellular.

What Nature could have done with protoplasm in six days I will not undertake to say, but she certainly did not make man within six days; nor even a sponge. The foundation was carefully laid, however, and in due time—that is, after one or two or more hundreds of millions of years—the cell was a man. Nor was there any change of material all the way. In brain, and muscle, and marrow, man is made of the same stuff as the oyster that he eats and the corn that he hoes. Life-stuff in the brain-cells, in a princely way, makes a study of life-stuff in a mosquito or a nettle.

The amœba is one of the simplest creatures endowed with life. It is called amœba, which is the Latin for changeable, because it never appears twice in quite the same form. In higher creatures the wonder is to see so many special organs for special purposes, but the wonder here is that there are no organs at all; and yet the amœba gets on very well, eating, walking, and voiding waste. It extemporizes organs as it needs them; and that part of its body which just now is legs, in a moment will be stomach; but it never has use for a head. Now it seems to be a line, but immediately it is a small stomach digesting a dinner. Here is protoplasm at its simplest. It is as much like the white of an egg as anything, which is only protoplasm in one modification. It is semi-fluid, and chemically composed of oxygen, nitrogen, hydrogen, and carbon; that is, of the same elements that make up air, water, and wood. So we have not one new element in life-stuff. It is altogether familiar material, only that, in right chemical proportions, it has the power of serving as the basis of life. It is not life, nor living, but it can live. In microscopic creatures it is active, having power to move, to feel, to eat, to multiply itself. But so exceedingly are these creatures like no life, that they are as likely to pass one way as another; that is, to press forward in activity, or lapse into the inanimate. These first efforts at life constitute a free belt, and life-stuff plays back and forth across a line—into life, and into non-living conditions, with great ease.

If you carefully observe one of these specks of protoplasm, you will now see it touched by another speck, like itself, or a little higher organized; and forthwith one folds about the other, and devours it. The swallowed particle is duly digested, and becomes a component part of its eater. This is the beginning of growth. It is protoplasm eating protoplasm. It has no mouth just now, only legs; but it will quickly become all mouth as it chooses. The wonderful organs that we possess are potentially there, and Nature in due time will pick them out, and specialize them; and then legs will stay legs, and stomachs will be nothing but stomachs.

That, in reality, is all the difference there is in living creatures—one is more or less thoroughly organized than another. The tissues of a horse, or a tree, or a man, are all of the same material as the amœba, only more or less elaborated and specialized. Even the fibers of our nerves are renewed and grow from the contents of added cells of this life-material. Bones are hardened masses of the same. Amœbas and their relatives went on eating each other, and in the haps of eating some hard particles were swallowed; and this, which was not life-stuff, but lime in the water, or sand, they began to utilize in a protective way, and finally made it very disagreeable for any other creature to swallow them, because they had lime enough about them either to cover themselves with shells, or to form sharp spicules. A good deal higher up the lime was used up inside as bones, instead of outside as shells. But however you change shape, or adjust the organism, all creatures must grow on, and be constructed of, the same material. Even the brain, the proud seat of intellect, is protoplasm; and it is protoplasm in almost pure form—the least specialized of all in the body. But the brain is the seat of the highest complex functions of thought, memory, emotion, and will; that is, the most complex functioning occurs in the least complex or specialized life-stuff. We will not forget that fact by and by. So it is that Nature, with infinite patience, works on. Who, looking at the microscopic atom of slime, would have dared to prophesy that evolution in a cell would eventuate in a being who, constructing a microscope, should catch a primordial cell and make of it food, not for his body, but for his mind? But that is what has come of it—Huxley studying an amœba.

But, while accident suggested the shell and bones, yet the jelly-fish no doubt consciously took advantage of the accident, and built with a purpose. Who purposely builds his bones to-day? For all that there is good reason for believing not anything was ever done in this world without effort to that end. It is true, my bones grow without conscious determination on my part; and my heart and lungs work without direct operation of my will; but it is equally true that in the beginnings of all such things, will and effort lay behind them. Now a man who needs a shield makes one; the amœba had relatives that grew shields, and did it purposely. Mind has always directed matter, and you must never think of life-stuff as mindless, no more in the rhizopod than in man. It learned its lessons, and it learned them well. Its first was to defend itself, for it not only hungered for other protoplasm, but other protoplasm hungered for it. The second lesson soon followed—the lesson of economy in getting a living. It was in this way: If a shell had but one opening, there was but one access for food. But soon some of these tiny creatures learned to thrust themselves out in all directions in thread-like tentacles, and so take food more easily and rapidly. I shall get ahead of my topic if I do more now, however, than merely show you how life began to adapt its stuff to purposes, and established the general principle of inherited bias, modified by environment. Amœbas not only were begotten of amœbas, but adapted themselves to changed circumstances. Then the modifications were inherited, and became modifying forces or tendencies. So it was life-stuff began its protean changes.

The source from which organism is built up, as in man, is floating corpuscles of protoplasm in the blood. These corpuscles act very much like amœbas; floating along in the river of life, changing form constantly, and acting as if possessed of individual life. The economy of division of labor in nature has left the direct manufacture of protoplasm to the vegetable kingdom. No animal of high rank can make it. But we must take it second-hand from the manufacturer. We eat it precisely as the jelly-fish ate it; and then the blood carries it to every part of the body, and makes growth or repair. If there is waste or loss at any point, material is rapidly hurried in there to make it good. It is much like mason-work filling up breaches. Till about twenty, the building of the body is a steady process; after that repair, till fifty or sixty; and after that the waste is faster than the repair. The secret of a wise life is to keep a good supply of life material on hand; not to waste too rapidly, and not to compel the blood to use up too much stuff at one point. Too much and too early brain-building weakens all the rest of the building. Reproduction is a serious affair, that never should be allowed before the body itself is finished, and not then to the undue tearing down of what is built. Excessive waste at one point is the crime against nature.

So it is that all life is in wondrous sympathy. It is one purpose, in one stuff, working out infinite adaptations. I am a part of the life-building that goes on in forest and in fold; in the rose, the apple, and the animal. The vegetables we eat, and the mutton we eat, for no other purpose than to secure our share of the common stuff or protoplasm. Very low down there are jelly specks, microscopic plants, and you can not tell them from the microscopic animals. They all look alike and act alike, and are identical in substance; but, while one moves off in the line that ends in man, the other moves on the line that ends in the tree, that hangs with pears to feed man. The sap of plants is the blood of plants charged with free protoplasm in a state of ceaseless activity. Now consider the experiment with protoplasm that goes on in a seed, and that which goes on in an egg. It is all the same. Under the influence of applied heat they both go through embryonic changes, which are only the rehearsals of their ancestral history, and then one becomes a bean, and the other becomes a robin. The robin sings a song that it gets with its protoplasm, as inheritance; and the bean climbs a pole, by the same inheritance of bias. The old idea was, that when bodies were born, some extra-natural power put a soul into them; but now we know that, like birds and beans, our whole being, moral, mental, and physical, is in the germ cell.

It is wonderful how nice is the adjustment whereby life co-operates under all its forms—what an intimate sympathy of purpose. For this eating and devouring business is only a part of the co-operation. Sometimes it is not so serious a matter as being eaten. For we all help each other vitally, or destroy each other, by a subtle process of abstracting force without substance. This we do not very well understand yet, but will have to understand much better before we get to a good and full comprehension of life. There is also another interchange between the geranium in my window and my body; for it not only is a protoplasm maker, but it gives me the oxygen essential to a vital state of protoplasm in my blood, and I give it the carbon from my lungs, which it will build into its buds and leaves. So goes on the interchange. The battle-field of Waterloo gave bones to fertilize the wheat-fields of England; and the wheat-fields built the heroes who left their bones at Balaklava.

I said animals could not make protoplasm, but must always obtain it by eating fruit or vegetables. But there are exceptions; a few animals making life-stuff directly from the elements. That is, they take up water, ammonia, and carbonic acid, which hold the components of protoplasm, and live, and grow, precisely as a plant grows on the same. You and I can not do it. We may mix these elements mechanically as we will, or under the effect of heat and electricity, but we do not succeed in making any pabulum that will sustain life—not yet. It is slow work waiting for the plants and animals to grow, and the fruits to ripen. Perhaps some day we may be able to do better.

Now we will see, as well as we can, how this life-stuff is made. The laboratory where it is accomplished is more wonderful than that of Liebig or Huxley; and the work is quite too delicate for even our imagination. The tiny rootlet of a plant takes one two-millionth of a grain of phosphate of ammonia, and by the use it makes of it produces a motion through an angle of 180°. In other words, living protoplasm creates other protoplasm, and the process of doing it is one of intense activity of the entire substance of the plant.

So we trace all life material back into the elements of nature; and we then trace it forward in the process of daily creation. No extra-natural being is found, or any need of one. Have we therefore become materialists? I think we are all well on our way to see that neither inanimate matter nor life-stuff are stuff only; but that they involve a something else which I have called purpose—it is mind. Back, back, through the millions of years we go reaching for a final cause. But there is no beginning; no addition, no subtraction. The substantial elements are all there—always there. The potencies of life curl round our heads in the lashings of primeval ether; and, to our interrogation as to what is to come, the reply is as if you now were to ask, What shall the future be? Yet of this you are assured, in those unorganized elements lay the possibilities of life; and in life-stuff the potentiality of a Jesus, a Raphael, a Homer. There is no beginning, no origin, but of forms and relations. The only solution of the problem of life is to dismiss the idea of origin altogether. Its first forms on our earth were the spontaneous outburst of ever-present sentient energy. There are, no doubt, conditions and relations of life beyond the reach of our senses, or the conceptions of reason. Let the problem wait.

§ 2. *Common Life Apparatus.*

So far we have found all life to be conditioned by the presence of one common life material; and growth in all cases—plant, animal, and man—to be the multiplication of cells under a unifying principle, that, while specializing in organs, yet retains a substantial unity of the whole. But we are far from reaching the end of this commonalty in nature, for we shall find that not only is life-stuff always the same stuff, but life apparatus is identical also.

The first need of a plant is precisely the first need of an animal; and that of man is the same. This common need of all life is to find out facts—facts about what is not itself

—and then to adapt itself to what it finds out. Every form of life involves sensation, and sensation is the basis of all knowing. This is true of the cell, and it is true of the brain.

The apparatus needed for discovery of knowledge begins by fulfilling the desire for food; it ends by fulfilling the desire for truth. At first sensation was a diffused unspecialized power, and extended only to immediate contact; it now sweeps the realms of the stars. To accomplish this vast gain in the way of sensation, Nature constructed her greatest marvel. When evolution has done its last work on this delicate and complex apparatus, so that by it a soul looks over the universe, and studies the problems of infinity, it has only given to us the very same apparatus that it gave the sea-weed on the shore, or the oyster on a rock—the same with which the lobster, the worm, the bee, the elephant, fulfill their relations to the world about them.

The history of this apparatus is as wonderful as the history of life material. A life-cell, you remember, is composed of two parts—a wall or membrane, and the semi-fluid contents. The wall is different from the nucleus in this, that it is made by the nucleus; and in this, also, that it is sensitive to heat, light, and electricity. That is, you have in the cell-wall the quality that resides in all nerves, but you have no nerve. When the wall feels a sensation it conveys it directly to the contents of the cell; that is, it converts the heat or light into motion—the whole cell responds to the sensation. The cell has obtained knowledge, and has used it. Suppose now an amœba is touched by a particle of food; the whole amœba knows it equally in all its parts; then it closes in upon the particle, and eats it. The nucleus grows, because the walls are irritable. If this irritability or sensibility were not there, it would not know the presence of food, and would not grow. This irritability is precisely that, and nothing less than that, irritability which in us is conjoined to a complex system of nerves, and is the key to all physical pain and pleasure.

Uniformity of irritability could not, however, long continue in the primordial creature; for, by acting in one way more than another, sensibility would be concentrated, and a nerve spot originated. True enough, and so there are creatures with only one nerve. The creation of that one nerve, however, was a glorious achievement on the earth; and I wish you to conceive the world in possession of that, and no more. It is the key of a brain, by and by; but not for at least one hundred or two hundred millions of years. This one nerve is a maid-of-all-work, and all sensation travels at its expense. It does all that is involved in hearing nerves, and seeing nerves, and nerves of motion. Its owner is a sac with two holes in it. Into one hole it constantly sucks fluid, which it expels from the other, gathering food from it as it passes.

This one nerve was soon followed by creatures possessing a double nerve, or a knot of nerves; then twin knots, or ganglia; one knot to receive impressions from outside, the other to respond from within. So a nerve system began to grow up, steadily setting apart special nerves for special sensations, for hearing, for smelling, for tasting, and for all the complex purposes of life. The first hint of hearing is in some of the jelly-fishes, cousins of the amœba, and consists, as an organ, of fine grains of lime, moving to and fro, with a nerve attachment; and the first hint of an eye is bits of crystal that reflect light, and also have a nerve attachment. As you ascend with organic life the nerve complexity increases, and the nerve knots gain power and character. At last there is a tiny head, although from the primordial cell itself there has been a head end, or oral end, with a certain dominant action about it. But now a knot of nerves gathers at this oral extremity, and these head nerves assume a decided degree of domination. The real brain does not appear, however, for ages yet; and when it is organized it is very simple, if it be very haughty. The insect brain is a series of nerve ganglia scattered along the body. The brain of a fish is entirely made up of a bundle of sense-nerves. The brains of reptiles are larger, but not much higher in rank. The brains of birds are, however, really grand affairs of the sort. The sense-nerves for the first time are put into the background, and those engaged in purely intelligent or reasoning processes brought forward. Your little canary has a noble brain, compared to its size. It can collect and use a fine range of facts, and is susceptible of very admirable emotions, and wise determinations.

This long process of brain-building has been accompanied by many a curious episode. It is altogether a living poem. The caterpillar on your shrubs has only nerves to direct a few simple functions like eating and crawling; but, by and by, when he weaves a mantle and folds himself up for a rest, his apparatus wholly changes; and when he wakes up as a butterfly to a free-roving, honey-eating life, the best thing of all is his new head, in which he has a bit of a brain. It is not of much account in the way of thinking, but is a knot of optic nerves to direct his great, new handsome eyes. He will spend his future life hunting bright flowers and pretty companions, instead of eating green leaves. So, when the tadpole becomes a frog, he not only gets lungs and legs, but he is set up with a very decent brain and nerve-system.

Long before man is reached the real brain is built, and becomes metropolitan. In the apes it is distinguished as gathering in itself all the nerve-centers that had been in lower life scattered about. It dominates the body, as well as sums up sensations. It is like the Bishop of Rome, slowly gathering control of all the churches of Christendom, and directing all their energies, while each one must report to him its every trouble or success. It is unfortunately possible for man to get a bad pope in the head. The development of the brain is proportionately after this manner: In fishes, as 1 to 5,000; in reptiles, as 1 to 1,300; in birds, as 1 to 200; in mammals, as 1 to 180. Among mammals, the gorilla has a brain next in size to man; but it is much smaller than the smallest human brain. The contrast is not a matter of size alone, but (1) man's entire brain is larger in proportion to his body; (2) the frontal brain is projected more forward, and over the olfactory organs; (3) the convolutions of the brain are more complex; (4) the cerebellum is larger. But the real relative power of man is in the fact that the cerebrum or brain of intelligence overspreads and dominates the animal brain. This is the seat of reason. Nature has at last created her own master. Henceforth the contest is to be one between the animal brain and the intelligent brain. If the senses successfully rebel against reason, there will be wild, sad work. In the power of reason is the saving of our souls. No power of man, or book, or extra-natural authority, must be allowed to despise or dethrone reason. The cerebrum, or brain of reason, in man is proportionately 170; the cerebellum, 21; the medulla oblongata, 13; the spinal cord, 7; and these make up the whole headquarters of the nerve apparatus. The spinal cord and smaller sections take charge of the physical life, and the cerebrum of purely intellectual functioning.

In the inferior parts of the brain is inherited the earlier brain of lower creatures, and there is stored all that functioning that is known as instinctive and automatic. What we do unconsciously is under the control of those parts of the brain, while our conscious thinking and determining is done in the cerebrum, or superior brain. Most of our work, however, is not a matter of consciousness at all. It was planned and worked out ages ago. The stomach is a completed organ, and its work needs none of our reasonable oversight. It is an automatic machine, and is supervised by the automatic brain. Other things, like walking, need some attention of the conscious brain, but are mostly supervised elsewhere. It is the investigation of new duties, and their generalization, that keep the cerebrum busy; decisions that concern our high well-being in relation to a complex society and the universe.

The brain of primitive man was certainly less intellectual, and was probably much nearer that of the apes. The average brain of savage races is less in size, and far inferior in functioning to that of civilized races.

I have traced the nerve-system on the animal line, and have shown it to be but one connected growth—the unfolding and upbuilding of a single idea. Plants also possess the common sensation of the primordial animal life. They recognize atmospheric and electric conditions, and adapt themselves thereto. Some close their blossoms before a storm. The acacia folds its leaves together, and irritability everywhere increases; at night the same movements occur, and there is a state of decreased irritability. The primordial plant-cell begins life indeed precisely as the primordial animal-cell—possessed of irritability and contractility, and power to convey sensation. It needs little observation of vegetable habits and structure to discover something very like a nerve-system. The barberry throws its stamens forward at a touch of the ovary. Many plants bend with the sun. Some open their flowers only at sunrise; the enothera waits for the sunset, when, if you listen, you will hear its buds burst their sheaths, and expand with a report. The sensation of sexual desire exists in plants, and influences reproduction. The complex parts of a flower are rightly considered a sexual nerve-apparatus. A grape-vine feels inarticulately for a support, and moves around for it with fingers that work on precisely the principle of our own fingers. As you see it grasp the trellis, and climb for air and sunshine, and to fulfill the function of reproduction, you are conscious of being in a world of sensation. In fact, the plants have senses by which they discover needed facts. The roots hunt out water where you would fail to discern it; and the elaboration of leaves is more sensitive to heat and light than are the skins of animals. The trees and bulbs in spring are sensible of the longer days, even when April snows linger. The atmospheric ray is then predominantly blue, and the plants comprehend that it is the ray that calls for generation. In summer the yellow ray predominates, and every tree knows it is the ray to elaborate growth. In autumn the red ray predominates, and all the plant-world at the touch of that—the least refracted ray—knows that it calls for ripening, maturing, and slowing up the activities. These same rays affect human life in a similar manner: the blue ray belongs to the babe and mother; the yellow to the growing child; the red warm sun and fire to old age.

The discovery of flesh-eating plants is in the same line. The sundew, in five minutes after contact, will begin to move its tentacle over a bit of raw meat, and in half an hour will have tightly inclosed it; then by some method of sensation the fact of the meat being there will be communicated to the other tentacles, and they all bend over the coveted morsel and begin to digest it. Insects are caught in a viscous fluid, and then eaten. How do the glands and the tentacles find out what they evidently do learn? where is the purpose to eat located? Dr. Asa Gray insists that climbing plants have feeling; that their climbing is not mechanical, but a distinct effort for personal advantage. This commonalty of sensibility, wrought out in us in a nervous apparatus concentered in a brain, and in the plant-world reaching up to the elaborate arrangement of foliage and flowers, suggests a unity of life that is a demonstration of evolution. Our whole economy of life is an adjustment of a sensible structure to environments. We are all built up from a common cell, on diverse lines, for common ends. It is equally true that the process of living in the animal and in the vegetable kingdoms involves the same principles. Food is changed into living substance by purely chemical processes, and we all grow in like manner. You would find it absurd to conceive of one nerve being created in your finger by an extra-natural process. But following back along the line of natural development, you see that ever, out of one adjustment, a higher has risen. The higher also implies the preceding as a substructure. By no other path could Nature have reached man but by that of continuous development; and it is equally evident that by this method Nature could, and did, accomplish all the creating that is manifest on the globe.

I hardly dare open the fascinating topic, which involves all of metaphysics as well as physics, or more than refer to the general fact, that the universe is always interpreted to us in terms of sensation. Our nerves, elaborated over every particle of body surface, constantly report what is going on about us to the sensorium in the brain. Some of these reports come in through the eye, and others through the ear or nostrils; and we must take them as reported. We call a rose red, which only means that it is such in our sensations—the least refracted ray touches the eye with a sensation which we denominate red. Most of these sensations are very complex. A discharge of electricity comes to the eye as a flash, to the ear as sound, to the tongue as a prickliness, to the nose as a smell of phosphorus, while a nausea is produced in the stomach. All these sensations rush into the brain, and the world without is to us that, and only that, which our senses determine it to be.

As a nerve apparatus was constructed, muscular growth was adapted to more rapid locomotion. The slow creatures of the earlier eras were followed by more speedy. The reptiles in turn swam with speed, or ran and leaped, and far and wide sought out knowledge for their own ends. Then came birds that cleaved the air, and went from land to land, over sea and earth. Quadrupeds followed with the speed of horses, foxes, and bovines, that ranged the continents. Finally man, the true cosmopolitan, appeared, who supplements natural development with railways, telegraphs, telescopes, and spectroscopes. The end ever in view is the accumulation of knowledge. The brain grows as cosmopolitanism increases. The birds know more than saurians; the reptiles were wiser than oysters. Self-conscious knowledge is that which alone distinguishes man, and therewith a power not only to accumulate facts, but to generalize them into truths, as far reaching as eternity and infinity. Naturally the love and worship of truth is the true end of man, and thereby to build of it character. Looking at the amœba as he swallows his neighbor, you can very little foresee a being whose conception of the highest living shall be to give his life for another, and whose ideal is worshipable only as the Supreme Father, that dies for his children.

We shall, however, come quite short of a true conception of evolution if we fail to see that the whole process involves sentient purpose. Effort invariably precedes achievement. Nature is the carrying forward of a plan. Man is not a hap in a mechanical or a chemical combination. It is the desire for knowledge, to ends of self-growth and betterment, that inspires the cell, and it is the same that inspires man. With finer organism for study, he adds to his apparatus appliances for gathering knowledge from the depths of the oceans below and the starry depths above—till, conceiving infinite wisdom and eternal life, he believes that to know such wisdom is to have such life. Apparatus never precedes demand, but a preceding potentiality and need demand apparatus. The body is not made, in any part of it, to do a certain number of things, and then set to work; it is, in all its organs, the result of work.

This appears all the more forcibly when we consider the re-adaptations of parts of our organism to new uses. For, as a fact, there is no part of us but is some old part of bird or beast, worked over for higher utilities. Man's lung was at first not a lung at all, but a bladder. His ear was not at first an ear, but a fish's gill-slit, worked over to a new purpose. So the wing of a bird was originally a lung, and still retains, to some extent, the service of aëration. In fine, there is no evidence of a mechanism created by a Final Cause, but every evidence of purposive readjustment under the influence of effort. Nothing is complete, but is in the making, and may be made over to serve new ends. Not one organ now functions according to its first draft. When any organ has no further plan in the economy of progress, and can not be readjusted, it is aborted. As we cease functioning as brutes, our organs are changed to a more intellectual type. The brain enlarges, the jaws are weaker, the nose points for thoughts instead of game. The tip of the tongue has nerves of touch, but not for taste. Civilized usage has lost sight of this function of the tongue, and, instead, uses it for articulation. But an idiot always reverts to a habit of judging articles first by smelling, and then by touching with his tongue. The sexual function is universal; but sexual organs are in all stages of effort to express the function.

§ 3. *Common Life Functions.*

We must now turn to consider another class of facts, of most astounding character, and far-reaching import; that is, that we inherit, and possess in common with the whole animal world, not only life material and life apparatus, but life functions. For it is a fact that Shakespeare, Darwin, Humboldt, do very little by purely human intelligence, but nearly all they do precisely as the brutes. This is not only a general truth of all men, but is specially true of most men; for there are few in whom reason is so predominant as to lift them much above butterflies and beasts. Few live with any sustained power above sensations and emotions common to dogs, and even wolves. Even their religion is based on purely unreasoned phenomena, used with automatic emotion. Prayer may be only an expression of animal fear. Unfortunately, while not attaining pure reason above, men demit the fine instinct inherited from below, so that their lives are spent in an open court between sensational-rational on one side, and rational-ethical on the other. This is seen in the lack of human foresight, and the consequent horrors of poverty. The ant, the squirrel, the bee, the bear, do not lack for storage, ahead of immediate ends, so far as such provision is possible; but the masses of human beings suffer purely from unnecessary lack of prevision.

Still, the tendency has been upward, and the single power of response in the cell has become a marvelous complexity of sensations, and from them perceptions. The odor of your footsteps, days after your passage, is easily detected by your dog; but he has never yet written a poem, although his love is not far short of a living poem. The fragrance of a rose, the result of something so infinitesimal as to elude our observation, touches the olfactory nerves, and reports to the brain, so as not only to guide our steps to the bush, but so as to awaken in the whole system joy, and health, and thought:

> "One harvest from your field,
> Homeward brought your oxen strong;
> But another crop your acres yield,
> Which I gather in a song."

A root will detect the one twenty-millionth of a grain of phosphate of ammonia, of which only one thirty-millionth can be of use to the plant. I have, while sitting on my porch, watched a clematis reaching out its arm in such a human way for support that I have reached my own in response. See, in any grove, how all the trees yearn upward for light; it is not quite unlike an audience eager for truth. Every leaf responds to the sun, while a plant in your cellar dies for longing, when its hope is gone. Our own bodies are of the same sort, with added consequences.

When in Chicago, acting for a time as President of the Kindergarten Association, I found that of all the "gifts," children under six or seven preferred the yellow. I have already referred to the relation of colored rays to our states of body. Evidently, growing children love that ray best which is most directly concerned with growth; while red is most congenial to the old man's spirit in the autumn of his years. It is all one with man, plant, or animal.

You will quite as readily detect in vegetable life those attractions and repulsions which constitute so large a share of our emotional existence, and are the basis of most friendships and love. There is an acacia called the mad-plant; it bristles when disturbed like a cat—its leaves standing out in every direction, while it discharges at you the most viciously bad smell. It gets over its rage in the course of an hour, and behaves itself decently. The sensitive plant you have doubtless often observed. The friendships of certain plants are noted by their always growing in each other's company; others refuse to live together. It may seem doubtful to many if so material a basis underlies our loves. But no careful study of psychology will fail to open your eyes to the fact that physiology is at the bottom of the most delicate emotions. We need each other, and feed each other; that is, are complementary. It is equally true that many natures destroy us. A psychological cannibal is a possibility. If you trace this matter of friendship from the plant to the animal kingdom, you discover that ants have established a tender emotion for wood-lice or aphides—establishing nurseries for them. Their mutual attentions and favors shown are among the curiosities of nature. So the shark and pilot-fish have established a good-will where no other partner is acceptable. The alligator allows his teeth to be cleaned by birds that he carefully abstains from injuring. Natural enmities exist of the same sort. Certain woods conjoined rot, as certain animals quarrel. In plant, animal, or man, the response which we call attraction and repulsion, if carefully considered, will be found to be identical at the base. Our dislikes often seem irrational, but they have a natural physical cause; so that if a man never did anything else than like and dislike he could be a vegetable. The plant shrinks at a touch, a bull roars at a red flag, and we abhor those of another race. The black, the yellow, and the white races are spontaneously inter-repulsive. Man, however, has the higher and controlling power of reason to direct his loves and restrain his hates; a power, so far, as often used to the destroying of natural good, as for the prevention of evil.

Let us go back to our amœba once more, and see if we can make coherent this common functioning of life. We shall not now consider the nerves or nerve-system, but the power that travels on the nerves and expresses itself in nerves. You remember that the amœba has this nerve-power, although he has no nerves; that is, the power or function precedes the organic specializing of power, and is possessed by the primordial cell and by primordial creatures. The whole cell—that is, the whole body—receives a sensation, and makes a response as a whole. He feels everything from top to toe, as we say, only he has no top nor toe. When he walks he can do nothing else. This kind of action, which extends quite a long way in evolution, is called reflex action; that is, a sensation is answered by a response, without comparison of sensations at some headquarters, for as yet there are no headquarters, and no nerves to carry the reports. Simple as this reflex action is, a very large share of all our own movements are of the same sort. Sever a man's spinal cord, and his limbs below will no longer obey his head. He may will as he likes—not an inch will they budge. Stick a pin in his leg, and no report can reach the head, for the nerve-connection is severed. But, while his head-brain does not know he is pricked, he himself knows it in his legs, and he kicks vigorously in response. Tickle his foot, and he jerks it away; but not by brain orders. He does not know that he knows that he is pricked. The kicking and jerking have been done precisely as an amœba acts by direct response, or reflex action. If you will consider what it is you do most, and do best, you will see that a good deal of it is cf this sort.

But Nature pushed forward her apparatus for better considered work. Every sort of power was specialized out of general power, and was localized, with nerve connections. Some degree of comparison of sensations probably existed before any head was established; but we must remember that the ovoid cell, from the outset, really had what may be called a head-end, and in it resides a certain control. Conscious action, however, can only date from the point when comparison of sensations occurred for the first time. The increased specialization of functions into connection with feet, stomach, head; and with eyes, ears, and mouth, and the gathering of the nerves of all organs into one group, established at last a very positive comparison and consciousness. The amœba swallowed whatever came into contact; but soon choice set in, and a very positive taste. The bee takes sugar, and rejects flour. The fish selects his bait. The cow rejects coarse grass, but the horse prefers it. Even the earth-worm prefers dry leaves to green. Man selects from a broader range of foods, and is omnivorous. Reason is a very complex choice. So the touch of the jelly-fish became by degrees the complex sensation of higher life; and man inherits not only the simple reflex, but the conscious complex. With the sensorium, or sense-brain, rises the cerebrum, or reasoning-brain, in higher animals. And this, too, with man is an inheritance; only that with him it spreads over and forward of the sensorium, so that sensation is no longer supreme, but a co-ordinate power.

The complex sensations of a human being, hastening inward to the brain, to be considered and compared, and acted upon, are like the reportorial corps of a great daily newspaper. Myriads of facts from the outer world, even from the stars, the winds, the flowers, the loves of friends, their sorrows, the relations of commerce, throng the highways. At the head-office these must all be considered comparatively, and answers telegraphed back in rapid response. This power to compare involves also the power to record and remember, for no sensation ever travels the nerve circuit without leaving a record of its purport. Even our feelings about sensations are all put down indelibly. Potentially, all this power lies in the amœba; specifically, it is for the most part in the possession of animals; man lifts it to higher degrees, and to that generalization which constitutes, not only knowledge of the universe without, but of the microcosm within. Man knows himself; is conscious of the world he himself constitutes; is, in fact, self-conscious. The animal reasons, but does not know that it reasons; man recognizes himself as a reasoner.

We now have the second grouping of sensations to consider. The first we found to be those which led to immediate response or reflex action. The second group is of those that, having been conscious, or comparative, have ceased to be so, and now end in instinctive action. Where action of any sort is often performed, the tendency is to make it automatic. If performed by several generations of individuals, it becomes an inherited tendency, and is accomplished without consideration or choice,—even of necessity. It is not quite like the performance of a Corliss engine; but, approximately, instinct is mechanical. It involves just enough educability to make it possible for ants and bees to modify their work slightly to environments. The lower instincts are in the least possible degree teachable; the higher approach almost to conscious comparison. Bird instinct is far more adaptable than the instinct of bees. Instincts are thus graded all the way from absolute automatism to the verge of rational choice. Probably man himself affords, in himself, the best illustration of this range of instincts; for in us nutrition is absolutely out of conscious control, while walking is but semi-instinctive. The heart works mechanically; the eyelid is but half under mental control. So it is that, as we act in part by reflex action, so we act in part by instincts. Heredity is a vast bundle of inherited tendencies. It is a bundle of old life-lessons, well learned, and needing no more rational consideration. We often walk in fits of abstraction, without thinking of our steps; and I have heard a person of veracity say that he had, when very weary, fallen asleep while dancing, yet finished the figure. Whatever we do by groups or classes, we are liable to do instinctively. In sleep our work is, for the most part, reflex, or possibly instinct. For reason is off the throne; comparison of sensations ceases, and so the disconnected sensations play wild with our wits. The somnambulist and the medium are automatons; whether the latter be self-operative, or operated upon by other psychic forces, is an open question. To observe the extent of your own automatic instinct, undertake to select the muscles with which you will utter the word mother; you will find that the will has not only no power, but that the intellect has no knowledge of what muscles must be used.

Still more difficult is it to understand those actions which we do periodically, without conscious, or at least determinative, choice. For, in fact, a very large share of our actions is covered by spontaneous periodicity, recurring, like sleep, once a day; or hunger, in obedience to daily habit; or once a week, or once a month. With such actions the will has little to do; nevertheless, we recognize the general law that an animal is fully justified in following exactly the line of spontaneity, while a human being has a moral obligation to judge whether such action can be controlled for ethical ends.

Such we are; in the two lower groups of functions we are in no ways distinct from the whole family of life below us, and in the third group of direct conscious rational acts, we are only higher than the animals in the degree of power to investigate, to compare, to group, to generalize, and abstract, and in the fact that our consciousness, by abstraction and generalization, has become self-consciousness, and therefore involves ethical laws. Persons with small upper brain are almost wholly instinctive and spontaneous, as are also children in early life; while savages are possessed of instincts of a brutish sort, that are wholly demitted by civilization. I have referred to the power of the Australian to follow the scent of thieves, tracking on all fours like a dog. I received recently from Mrs. Harrison, of Adrian, Mich., a most intelligent traveler, a photograph of a young track-hunter of this sort in the employ of the police. It thus appears that instincts, which in civilization are demitted, still belong to savage life. It is possible, however, by reversion or atavism, that such instincts may recur at any time, nor is it impossible that we should revert so far as to control, by conscious will, functional powers that have been left very much lower down in evolution. Dr. Groux, of Brooklyn, and a few others, have had the ability to stop the beating of their hearts, and set the organ in motion at will. No doubt that what is called mind-cure is based on a latent power of will to control functional activities that have become instinctive, or are reflex in character. Precisely how far mind power may secure reversionary control of automatic functions can not be determined as yet. It is not impossible that the automatic waste of the system, the demands of nutrition, and all lower functions may pass under control of rational volition. It is easy to see that it is getting to be impossible to have any comprehensible physiological study that is not psycho-physiological. The reproductive functions are at first carried over from physiological instincts to become creatures of the imagination, excited to vicious, or exalted to ethical character. Eating and drinking, or all of nutrition, in like manner, is made a question of morals. How far the whole being shall yet become psychical, and transformed in its automatism to conscious subjection to moral will, remains to be seen. Nor are we able positively to aver that the present specializing of force in the human organism may not be gradually redistributed much more advantageously to an extreme state of psychical culture. Man has only begun the study of himself, nor does he more than begin to transfer his vast control of nature without to nature within.

However, not to venture to speculate in this direction, my present object is fulfilled by showing how man functions in common with the whole animate world. There is no breach in life-material, life-apparatus, or life-functioning between the animals and human beings. Nature was not exhausted at the highest point of mammalian vertebrates, and compelled to confess that she could make an ape as a pattern, but not a man in the likeness of the ape. To assume a special creation at any point is to deny what has been proved, that is, consecutive development of functional power. There is but one thought from beginning to end of organic evolution. Review the course you have traveled, and it sums up briefly as follows : 1. The crystal is the movement of atoms into orderly plan, by an inner impulse. 2. Plants are sensitive, and responsive to heat, light, and electricity, and they also move by a contained purpose. 3. The lowest animals act by an impulse that involves power of adaptation to environment, while they advance from simple to complex forms and relations. 4. Insects act by a vast accumulation of heredity—that is, experiences passed into functional habits, or instincts. 5. The higher animals, in addition to more complex instincts, have a higher degree of conscious action, and are modifiable by education. 6. Man comes on the scene possessed of the simpler reflex, the lower automatic, and the higher instinctive action of all creatures below, while his conscious will passes into degrees of moral choice, based on an intricate comparison of consequences and motives.

7. Higher races take up consciousness as confirmed self-consciousness, passing under ethical laws, and established moral instincts, until at last the tendency to pass into instinctive automatism is reversed, and a power is established which we call the soul, that assumes psychic control, and leads us Godward.

If at any point in this wonderful unfolding of sentient purpose in organic relations an extra-natural hand is needed, it is not at No. 6, but at No. 7; not where the animal anthropoid begins to walk and chip flints, but where, far later, he secures a reversal to the tendency, dominant in all lower life, to become a finished creature, to be set aside for a better; and in himself establishes a decretive power over himself. It is where he has formulated a golden rule, and has subjected his physical instincts to psychical laws; it is not at Adam, but at Buddha and Jesus, and Channing and Lincoln. The real breach with lower life is one that man himself achieves, not one to which he is born; it is an ethical severance of his fate, but not of his origin, from the kinship of brutes; and, while it is a severance below, it is an alliance of the most intimate sort above to the Self that is higher than himself—the Eternal and Infinite Self, to whom he sums up his conscious relations as a child to a father. Creating this transference of his higher relation, he creates religion, poetry, philosophy, science. So, at last, the human being is a philosopher and a scientist; but he is also the polyp, the amœba. In him is all the past of sensations, as well as all the future of rational hope. His states of consciousness have not only been enormously multiplied, but they have all been registered in his very being. These can all be recalled from the register, so that the past is for him an ever-living past, while the future may also be made present by that growing power of prophetic foresight that results from habit of tracing consequences to adequate causes, and causes to involved consequences. Science is the gathering and grouping of such recalled and anticipative facts.

Consider how many myriads of facts sum themselves up in one ethical or intellectual determination of our lives. Consider the amount of intricately involved sensations, conceptions, perceptions, thus interlinked through all the past in a purposive chain, summed up in the act of Darwin in writing the "Origin of Species." So it is, by a process practically to us infinite, matter-material becomes mind-material; a rose becomes a poem; an animal becomes a living soul.

Nor in man, notwithstanding the establishment of self-determinative control, does the same old tendency cease to pass over the achievements of reason to instinctive automatism. The higher moral life, constantly reaching before, ever grows instinctively pure and just in temperament. Degenerative natures thus become wholly instinctive, lacking as they do effort for the better, and becoming habitually evil. In all of us this is the great battle—the God and the devil in us—whether we shall choose the right, or become the wrong. Unfortunately, it is far easier to drop into evil habit than to climb to ethical power. Piety is the instinct of religious aspiration; but, if the aggressive moral effort cease, piety becomes automatic ritual, destitute of religious character.

The important point is that man is, or may be, the only incomplete point in evolution. The creatures of instinct are finished. Their evolution is ended. Man is where Nature, as a reasoning choice and will, is now at work; and in him she is at work not directly at further organic development, but at psychical functioning. That there should be a vast amount of arrested development on the road is in accordance with all the history of evolution—even whole races dropped into automatic incapables. The crow outcounts a Bushman; many a horse is wiser than his groom. These are the finished people everywhere, and they occur at all stages of development. Looked at as Nature in her workshop, there is no enormity in man's being what he is;

but, considered as the special work of an all-wise Creator, his condition is inexcusable. The theology of special creations can never escape the necessity of apologies for God; and, at the climax, it fails to make him the Father of Righteousness without making him accountable for sin. Plainly the truth stands, and ever must stand, that if I do not rise above the beast my lot is his lot.

LECTURE II.

SOME LINKS NOT MISSING.

THE opponents of the evolution hypothesis are justified in saying that, as by it a consecutive chain of living creatures from the origin of organic life is implied, its friends should be able to demonstrate its truth by showing at least to a reasonably full degree the links of such a chain. The popular estimate is either very vague as to really what evolutionists have been able to do in this way, or it supposes a decided lack of success. Those who comprehend at last that species do not constitute impassable barriers, yet hope to establish at some point the necessity of supernatural interference. When Prof. Marsh returned from his first expedition in Colorado, bringing the remarkable finds out of the old Tertiary deposits, he was asked if he had found the missing link. "Yes, sir!" he replied, "thousands of them." The fact is, however, that a good deal more is made of this missing link than is warranted. The wonder is, when we consider the vast field to be searched, covering the whole globe, and miles in depth, that any large amount of consecutive history of the planet can be established; for not only is it impossible to examine this record with any speed, but most of the forms of prehistoric life have perished. Vast as the finds seem to be, they do not include an appreciable fraction of that which reveled on the earth in successive generations. The uninvestigated is to that brought under notice as one hundred thousand to one. Remember that in this case a cumulative argument becomes a demonstration; because, after a reasonable number of links establish a degree of development, the creation theory is disproved. By that theory each creative day was the absolute beginning of a new and disconnected order of creatures. But, as a matter of fact, every order, genus, or species of life—every class of any sort—overlaps the next. There is as positive distinction and separation between fifty sorts of fossil forms as between six. So you may as well insist on fifty days of creation as six days. The demand, therefore, for a production of missing links is obviated to a great extent, so long as the demand for a separation of creation into six distinct periods fails. This can not be done; there are no such breaks in the order of events. But this is true, there are a great many long, long periods, in which no fossils were deposited—periods, it is supposed, when land elevation was going on. If the land were sinking in any section, life-forms would be often ingulfed in deposits of mud, or gravel, or sand; or overwhelmed, as the coal-deposits were in the carboniferous ages. Mr. Darwin gives his reasons for believing that most of the great formations that are so full of fossils were deposited when the beds of the seas were sinking; and these eras were succeeded by long, blank periods, when no deposits of extent were made. But these blank periods by no means correspond to the mythical nights that are supposed to have followed the creative days. They simply occur when they happen, and make the consecutive study of life-forms all the more difficult.

At the best, most of all life-structures have crumbled to dust or been destroyed by heat, and are lost. You should also consider, before we try to look up the missing links, what an enormous passage it was from the primordial cell up to the present day. Whether we reckon with Thompson one hundred million years, or extend it to two hundred and fifty or three hundred millions, our road is sufficiently long to make it improbable that the record has been fully preserved. Consider, also, that this record, where it exists, runs through leaves of rocks over one million of feet in thickness. This making of man has taxed Nature in all her living past, in all her energies. To find all the steps of creative development is no simple matter. Those who think that all that is wanted is a race of men with tails like monkeys, or of monkeys that can kindle a fire, are totally ignorant of what is demanded.

The first link of all should be a something so midway between the organic and inorganic that it can not be positively established as either. This is not, however, required by those who, like Darwin, presuppose life to be already begun, yet it is one of the easiest links to establish. The rhizopod is not even cellular, nor in the most limited sense is it organic, yet the rhizopod is possessed of sensation and purpose. Here we have the clearest evidence that the inorganic may not only have the semblance of life, but actually possess life itself. This link is in reality the most important one of all to study and comprehend. The transition from the organic to the inorganic carries us back not into the infinite realm of darkness and lifelessness, but into the realm of life and purpose. I shall not here enter into the biological discussions that arise, but refer you to that magnificent product of American study and thought, "The Origin of the Fittest," by Prof. E. D. Cope; and to the equally remarkable and noble monographs of Edmund Montgomery. I must in this lecture content myself with the mere statement of the transition.

The early differentiation of life into two kingdoms, animal and vegetable, slightly diverging in forms and functions, but always intimately interrelated, would obligate us to trace these two kingdoms back into some common life matrix; and at the same time to show, if possible, certain forms common to both kingdoms. We must not make the mistake of supposing the animal kingdom to be higher in time than the vegetable, but the two to be collateral. The one did not rise out of the other, but both diverged from primeval life conditions, each bearing off certain functions; yet there is at present such a relation between these two departments of organic life that we may relatively consider the vegetable as the lower. As a rule, it alone can construct protoplasmic material from inorganic elements. It does the primal work, wholly automatic, while the animal kingdom, ceasing to spend its energy in creating protoplasm, devours that already made by the vegetable, and spends its force in higher consciousness. No doubt the first differentiation of the two kingdoms arose at a point where this division of labor happened to occur: some protista devoured and learned to devour protoplasm already prepared by their fellows.

In establishing the required connection between the two kingdoms, we shall have no difficulty at all; for there is a large group of existences that it is impossible to positively classify as animals, and it is equally impossible to establish their vegetable character. They constitute a table-land between the two kingdoms common to both. The name given to these existences is protista, or animals that have functions of a vegetable sort. They take their nourishment through roots instead of mouths, and in so far are plant-like. A polyp is only a cylinder adhering to a plant, without arterial system or respiration. It is merely a double layer of cells, hollow in the middle, with a membrane that supports the muscles. It is propagated by buds or granules that drop off when ripe, and adhere in turn to some other plant, and grow, and bud again. Yet naturalists assure us this is an animal—an animal that lives, eats, grows, propagates itself like a vegetable. Then just beside these you find plants that act, eat, and otherwise are like animals. The Venus fly-trap and several other plants have apparatus for catching, and digestive organs to dispose of insects and bits of flesh. They catch and eat with as much appetite as a frog. They will devour beefsteak if you will feed it to them.

We pass at last out of the no-man's-land and are surely among animals. Here life is at first propagated, or multiplied rather, by subdivision. But we know that all later life is reproduced by eggs, which are cells detached from the parent. In this cell is folded up not only the germ of life, but that bias that produces a special kind of life; and, as we saw in a previous lecture, the whole family history is there too. There is nothing in this world so wonderful as an egg. By raising the temperature it is to be made to develop in its shell flesh, bones, feathers, or it shall in the womb develop all the parts of a human being. Now the first eggs were nothing more than cells of the inner layer of the parent, and the parent was one of those creatures that you can hardly otherwise determine to be either animal or plant. The sponge is such, and its egg is a seed on the way to being an egg. For really a sponge lays eggs, and they are bits of protoplasm, like other eggs. And these eggs go through the changes of a more highly organized egg. In a germinal way the development of animal life is thus begun. As soon as hatched the embryo will attach itself to some object, and go on to attain the condition of an adult sponge.

If anywhere, it would seem probable that, unaided, Nature would find it impossible to bridge the way for lower forms over to those with backbones. For ages every creature had its bony part outside, or else, inside, he had something very different from a skeleton reticulated from a backbone. Then came a wonderful change, almost as if an animal should turn himself inside out, and whereas before his skeleton was outside him, henceforth it should be inside. The grades of change are not all discoverable, but enough are on hand to show that it was not by a special creation. Just at the lower end of vertebrates there is the shark with an inside skeleton of cartilage that never hardens into bone. But before the shark came the lancelet, that had only a thread of gristle running through him, and with this a nerve-cord. Bits of cartilaginous formation began the change; then one line of it through a very simply formed fish. This line, with its nerve, became the hint worked out by Nature into the backbone, the spinal column. Why was this peculiarity so tenacious? why, like so many other tentative forms, did it not soon pass away? Simply because, although the creature possessing it was very insignificant and weak, yet he was swifter and more lithe than any of his neighbors. The race in life really has not been to strength, but to agility. His neighbors of the old sort wore clumsy hard-shells. Their skeletons were not much better than prisons. They were rather hiding-places than machinery for swift escape. The old warriors that wore plates of mail would stand about as good a chance against modern troops as these mollusks and articulates against the lithe vertebrates. They would be perfectly safe themselves, but then they never could catch the new sort. So the lancelet was safe at least. Then he could get his living more easily, could act more independently and daringly. And all that tended to the strengthening of his tendencies. He would have thousands of adaptations that the old slow-moving fellows did not have. With change of environments would come more rapid adaptations. It was impossible that the backbone, or back gristle as it then was, should not steadily gain in the race. The tendency grew more and more fixed toward vertebrates. The frail creature with just a line of cartilage through him was a happy thought. He was the first of a line of monarchs that by and by was to end in a stout backbone with a brain-case on the end, and in that brain-case enthroned reason and moral power. The peculiar and special ancestor of man was there at that time, and he was in the water.

In the water! And the next thing will be to get him out, and establish him on dry land. Did this not require supernatural aid? How can Nature turn a fish into a man? Nature is very patient, and she never hurries, and never gets impatient; and she has plenty of time on hand. It was over twenty-five million years ago that the lancelet began the great vertebrate career, and the alterations caused by environments have gone on ever since. But, slow as this progress has been, it has been immense speed compared with that made by preceding life forms. The spinal column was so adaptable as to insure more rapid and multifold changes.

You know there are some creatures now existing that move either on land or in the water. They are mostly provided with gills for breathing in the water, and lungs for breathing when on land. Twenty million years ago the amphibians were not only more numerous, but were a very powerful lot of fellows. They filled the seas and the forests, and ruled with terror. There were serpent bodies, and craning necks, with tails like crocodiles, and mouths filled with sharp teeth. Some were plated and mailed like an iron-clad. Fins, legs, feet, tails, wings, were all there in confusion. Some were sailors on the way to become land-lubbers; but some were moving the other way, and from being originally land-born were learning to live in the water. Some were like huge alligators. Others took to eating vegetable matter. Others began to take great flying leaps; and, finally, some of them did fly with queer wings, twenty feet across. But the matter that concerns us now is this, Can Nature turn a swimmer into a bird, or a land animal, without supernatural help? It seems as if special care had been taken to emphasize the fact that she can. If no other operation of Nature is openly done, and repeated so that a child can see it, this transformation is. Under your own eyes, in this month of May, is a creature going through all the changes requisite. He comes out of the water, exchanges his water structural affinities for those needed on land, and hops away croaking evolution, evolution. The frog, you know, is at first a tadpole. The frog is a land animal, but the tadpole is a water dweller. The tadpole swims like a fish, breathes with gills, and has a heart of only two chambers. He has no feet, nor any other adaptations for the land. However, if you will watch him, you will shortly see two legs break through the skin, and then two more. Then cut him apart, and already lungs are forming, which he will soon use on land, although as yet breathing with gills. After a little his lungs get filled, and he wants more air; another chamber is developed in his heart, and then his tail shrinks up and is absorbed into the body: and that is the end of it—and it is the end of his fish-life, too. So you have in your back yard, if you live in the country, an illustration of how your ancestors got out of the water. It was a long while ago, but a cousin is here repeating the process; though the frog can never by swelling become an ox, as the fable says; no more a man.

Of true fish, and other purely aquatic creatures, there are many that illustrate the process of acquiring limbs for land locomotion. Grant Allen tells us that, while traveling in tropical America, he saw troops of a well-formed catfish walking or shuffling overland by the aid of stiff spines set just under their heads. The Brazilian doras take journeys that last more than a whole day, and are fished for by the Indians on dry land. Not only this, but they go out of the water and gather leaves to build nests on the beach, where they deposit their eggs, and watch them with solicitude. The climbing perch of India not only walk on the land, but climb trees, by the aid of spines near the head and tail. On shore they eat worms and insects. But the approximation to permanent change of element is not in any of these cases apparent. They have, as the eels have, pouches near their gills for carrying water; and from them they obtain the oxygen necessary for breathing.

But some of these aquatic creatures did stop out of the water; and they secured such structural changes as fitted them to do so. Others even went farther up into the air. How was that? How did fishes learn to fly? Somewhere along the route they certainly did do just that. Scales appeared that were more feather-like. Some feathers are very scale-like to-day. The feather is recognized to be only a modification of a scale; so you see there is a general likeness between fishes and birds to begin with. And the wings are only modified gills. The earlier birds had tails like those of lizards, and feathers were horny protuberances on the sides. They had claw appendages, or clawed hands, from their shoulders. They could not have flown very far, but must have climbed at first by using their tails and claws. Gradually—that means in the course of some tens of thousands of years—birds were developed with soft feathers and airy wings; that is, feathers very full of air-cells, while the metallic glitter of scales had passed into the glorious gold and scarlet of our songsters. The archæopteryx is one of these links between bird and reptile that we have recently secured as a fossil. It is neither the one nor the other, but a real link. It has the feathers and hind legs of a bird, but the head, neck, tail, and wings of a reptile. We have also fossils of birds that have teeth, although no living bird has teeth. These intermediate forms, just after the great saurian age, are very abundant, as naturally they should be. The reptiles of that era were not in any sense typical. Nature had tumbled her copy in pi. In the enormous life luxuriance of those days were all conceivable chance combinations of limbs and tendencies. It must come about that these tendencies must be picked out, and more perfect types established. Some reptiles used membranes to fly with, and life steadily developed a tendency and power to fly. Scales became softened, and bones grew full of air-cells, and so wings came about; and out of the side of the saurians flew away the first birds. Clumsy, no doubt, but birds. What relationship would be less expected than that of saurian monsters and birds! yet the links abound to demonstrate that the crocodile and the nightingale are cousins. The token of a creative fiat does not appear; but evolution does appear, and it leaves its confirmation in the hands of those who do not fear to find it true.

In addition to these links that carry life forms up out of the sea, other links are found between all sorts of genera. The anoplotherium connects the swine with the cud-chewers; the zeuglodon connects the whales with the seals; the paleotherium connects the hog with the rhinoceros.

This is not a very bad showing, is it, in the way of missing links? but mark that, in a brief lecture, I can not begin to tell you even the names of the links, much less show you the remarkably close connection that is made.

The next apparently impassable gulf is that between egg-layers and milk-givers. The distinction, however, is only this: all life is from an egg; but some creatures hatch the egg inside of themselves, others by heat applied to the egg outside. The general connecting link here is the marsupial family—creatures that bring forth their young in an immature state. I read the other day of a kangaroo in one of the Royal Zoölogical Gardens that had held a little one in its pouch for weeks before the keepers discovered it. When their young are not two inches long, and the limbs are wholly undeveloped, they give them birth, and then carry them in a pouch in front. The young ones hang on to the mother's nipple without intermission. By and by the limbs are grown, and the little one sticks out his head, and begins to survey the world. Then out he jumps, and henceforth eats grass as well as sucks milk. How natural the development. For reasons of fear and otherwise, mothers held their eggs beyond the usual period. The young embryo was hatched, and almost as soon it was born. The mother would naturally fold it to her breast, and hug it into the folds of the skin to protect it. The natural skin-folds, in time, formed a shallow pouch, used still as a receptacle of the young, while the tendency would be to enlarge it, and make it permanent. All animals so endowed are called marsupials. You must go back at least five millions of years to find their beginning. They are the first and simplest of all the mammals, at one time numerous, but now represented mainly by kangaroos and opossums. They were followed by mammals of all sorts—insect-eaters, grass-eaters, fruit-eaters, and carnivora. The last of all the mammalia were the primates,—namely the lemurs, apes, and men. These last receive a combined heritage from all the above, and live equally upon flesh, fruit, and herbs.

But just as naturalists thought they had the lines neatly defined, separating the final and aristocratic class of mammals from their predecessors, a discovery was made in Australia of two creatures, since called the echidna and the ornithorhynchus, both being mammalian quadrupeds, but both of which laid eggs. The echidna lays one egg, and immediately places it in a pouch like the pouch of a kangaroo. Here there is a pre-marsupial in habits, bearing not the very immature young, but the egg in a membrane, to be hatched. The other creature, which is much like a mole in body, with fur, and a great capacity for burrowing, has also a bill like a duck, and lays two eggs at a time, in a carefully-constructed nest. Here, then, are two hairy quadrupeds that do not bring forth their young alive as do all other hairy quadrupeds, and they give suck to their young as no other egg-layers do. Prof. Owen says of the bones of the ornithorhynchus, that some of them are like bones of birds, others like those of reptiles, others like those of seals. The story of these exceedingly interesting creatures is very fascinating, apart from the remarkable links that they establish between milk-givers on one side, and egg-layers on the other. But you must turn to scientific journals if you care to know the minute history of one of the greatest biological discoveries of the century.

This is a general outline of the linking process as we find it demonstrated in fossil and living forms. You must not, of course, imagine the progress to have been a simple, steady affair. Advance was often lost. Sometimes the work of a thousand years was swept away in a cataclysmic throe of Nature. Ice ages occurred that reversed the general tendencies. Land-creatures were compelled to take to the water, abort their feet, and adopt the habits of fish. So in the water there are to-day warm-blooded milk-givers. But, on the whole, progress was made, and the steps are quite traceable, as I have shown you.

There is nothing, however, to compel us to suppose evolution to have, in all instances, gone on without any leaps or sudden transformations. Such changes occur yet, and doubtless were more frequent in the past. For instance, the plant-louse, the very common aphis, is propagated, like many other of the lower organisms, for even ten generations, by a sort of offsets, then comes a generation that lays eggs. Descent of this sort, not at all uncommon, suggests that there may be at least vastly larger cycles in the reproductive processes of Nature. We can not be sure what a very sudden and very marked change of food and climate occurring in the middle of a period of development might do with the whole series. One thing is certain, the great changes of structure that led water animals to become amphibious, as a tadpole becomes a frog, were caused by the drying up of their pools. They were enabled, by such revolutions of environments, to adapt themselves to a new life. More sudden changes of environment may have led to greater leaps of a startling sort. What may, or must have been, the metamorphic changes caused by the approach of a glacial era over a tropical temperature! It is certain that, from the rapidly increasing severity of the northern climate, the whole deciduous flora was evolved with considerable speed. It was also under the same influence that the hardy cave man was developed as a distinct race, to take the place of the river-drift race, which was of tropical origin, and unable to endure the rigors of winter. This cave man still remains about the pole with all his original adaptations to Arctic climate.

Nor are we so absolutely sure that the only beginning of life *de novo*, that is, the only break of the organic with the inorganic, occurred at one point in time. Nature may have had a multifold origin of life. She may yet be detected again at beginnings of life processes. 'This, you say, is a terrible doctrine; that of spontaneous generation. Well, it is in no way as revolting to common sense and facts as is the doctrine of creation from nothing. Life had one beginning, and we see now so much of its development by a purely natural process that we can positively affirm the beginning itself was equally a natural process. Why it may not occur again we do not see.

But it is more important to recognize the fact that low down among life's creatures, before the vertebrates, simultaneous origination of several forms may have occurred; forms very much alike, but not identical. Long before this time heredity had gained strength and a controlling force, so that the law of evolution was established, which is now operative—namely, that environment, playing on heredity, would control form and character. Those environments or circumstances that really did start the potential humanity, acted on possibly thousands of individuals with slightly diverging lines. So, when you come to the origin of man, there is much in favor of the supposition that the causes that led to the development of one anthropoid race led to the origination of several races. If this be not so, it is as yet unexplainable why, although all other races can be traced ethnologically and linguistically to a common origin, the black race can not be. Under the old theology it was painful to a kindly humanity to open the question whether all men came of one parentage;

theologically it was impious to deny it. For not only does the Bible so assert, but if it be not true that all sinned in Adam, then all can not be saved in Jesus. If evolution has done nothing else, it has swept away the notion of a sinless pair dwelling in a paradise, but afterward by sin plunging all the possible inhabitants of the earth, for all time to come, into guilt and misery. It has readjusted morals also, so that we are under obligations not only to the family of Adam, but to every creature that we can help to a higher life.

I have said enough to show you that, in spite of all the remarkable hindrances, evolution has secured a vast number of missing links, and made the development of life to appear as a series of undoubted causes and consequences. This it has done notwithstanding the comparatively few creatures that were preserved as fossils. It is, in the main, only shoal-water or sea-shore forms that were submerged and preserved. The earlier formations, for millions of years, were of a gelatinous substance, that could not have been preserved. These creatures have, however, descendants living in the deep seas, so far down that it is with great difficulty we can get at them. But of late, deep-sea dredging has brought to the light many of them, and we shall doubtless soon get a more complete first chapter of the world's history. Queer creatures they are. Constructed to live under the pressure of several atmospheres, or rather tons of water, whereas we are created to endure only fifteen pounds of air to the square inch. They literally come to pieces when brought to the surface. The effect is the same as if you should be lifted fifty miles into the air. Early life went on, no doubt, for millions of years before these jelly creatures developed texture enough to secrete lime, and so construct solid shells. This power to secrete lime is the beginning of geological history.

I can not understand by what process these facts of

Nature can be made to compromise with the theory of absolute creation. By the positive assertion of theology the animal species were created separately, and, after being named by Adam, were sent out from Eden over continents and oceans, each to discover his own natural habitat. There they remained until recalled to the ark, when the Creator chose to destroy man. Yet nothing is more provable than that the rhizopods existed ages before vertebrates, and marsupials were most certainly predecessors of mammals.

It will take us a long while to accustom ourselves to a universe in which we can find no God, that we can, by play of imagination, exalt to the heavens, or call down to serve on our prayers. His absence will leave a vacuity, and a guilty sense of having become atheistic will obtrude over us. The time will come, however, when the higher conception will become as instinctive and innate as the older and baser; when it will pass into heredity, and will give to the worshiper the same sense of divine warmth and comfort. The grandeur and unity of this wonderful life process, as unfolded by the evolution hypothesis, has for a reverent mind no impulse toward atheism. For, while it dispenses with the useless potter who made a few specimens of his skill for self-glorification, it does not rob us of the sense of being a part of supreme life—and life, eternal life, is God. The processes of its unfoldings are the heart-beats of One in whom is our existence, and whom we can truly love. For he who loves the manifestation, loves all that is therein involved.

I can not better close this lecture than by reading you that superb hymn of Miss Doten :

"God of the granite and the rose!
  Soul of the sparrow and the bee!
The mighty tide of being flows,
  Through countless channels, Lord, from thee.

"It leaps to life in grass and flowers,
Through every grade of being runs;
Till, from creation's radiant towers,
Its glory flames in stars and suns.

"Know that, like birds, and streams, and flowers,
The life that moves you is divine:
Nor time, nor space, nor human powers,
Your godlike spirit can confine.

"God of the granite and the rose!
Soul of the sparrow and the bee!
The mighty tide of being flows,
Through all thy creatures, back to thee.

"Thus round and round the circle runs,
A mighty sea without a shore;
While men and angels, stars and suns,
Unite to praise thee evermore."

LECTURE III.

WANTED ADAM.

SCIENCE recognizes the justice of the demand to show the missing links. It is not just to refuse to respond to the answering challenge, Show us Adam. Any refusal to heed a fair demand of this sort allows the case to go by default.

This Adam of theology is a curious and peculiar creature. He is assumed to have been not the equal of Shakespeare, for Shakespeare was purely a product of Nature, and of fallen Nature at that, whereas this created man is a product that Nature, at her best, is pronounced wholly incompetent to produce. Originally Adam was a perfect type—although there is no escaping the fact that he was a vertebrate mammal, built on the same organic plan as a whale or a horse. He understood the world by intuition, although his descendants have every one been compelled to start on instincts inherited not from him, but from the beasts; or exactly the same sort of instincts. Adam was originally in a state of perfect holiness and perfect happiness. How he could have wanted anything more does not appear; but he did, and in that new desire, which was childish, was involved a total collapse of goodness and joy for himself and all his successors. In fine, Adam was the express image of his Maker, created specifically for the glory of the Creator. No limitations of power can be supposed in the case of an absolute Final Cause; therefore, primally, Adam was perfect, morally and physically.

This is the hypothetical Adam who is wrought into so many schemes of a theologico-cosmological sort. If we grant the truth of the story, it gives us no dignity except that in place of being the finality and summation of all the past of evolution, inheritors of its achievements, we are made *de novo* from the dirt. It gives us one more endowment, the breath of our Maker, and then sets us down, organically and functionally, a brother of the apes instead of a descendant. Every whit of our progress is left to ourselves to achieve, without the guiding propulsion of an accumulated heredity.

I have before me a half dozen creeds, all of which assert and describe Adam as a product of this sort. The first reads, "We believe man was created in holiness, but fell from that holy and happy state, in consequence of which all mankind are under just condemnation to eternal ruin without excuse." The creation hypothesis seems necessarily to involve a fall, and the fall to include the succeeding race. For those who deny heredity in Adam are stout sticklers for heredity from Adam. Calvin says, "I ask how it happened that the fall of Adam involved so many nations, with their infant children, in eternal death, without remedy, but that such was God's will." The Synod of Dort says, "That there is an election of infants, no less than of adults, we can not deny in the face of God, who hates and loves unborn infants." The crass brutality of this scheme is entirely logical from the hypothesis of a creation. We are children of Adam, that is the trouble. If we *had* been children of monkeys, no such theological brutality would have been necessary, because monkeys are not created but developed. No one can fail to sympathize with the beautiful Shelley when he says, "I would rather be damned with Plato and Lord Bacon than go to a heaven with Paley and Malthus." Whittier sings it more gently:

"Had there been no Garden of Eden,
There never had been a Fall;
And if never tree had blossomed,
God would have loved us all."

But when I turn to the Biblical account of Adam I do not read the story at all as I find it in popular apprehension and in modern theology. It astonishes and interests me greatly to find that the "inspired" authority does not warrant the accredited belief. By that account Adam was a very pitiful and weak savage. Whatever he was in body, he had no moral nature whatever until he had disobeyed his Maker; and if he had happened to have done the other thing, and remained obedient, he would have remained a savage to this day. He was, at the best, only one more sort of beast—made, to be sure, but on the same structural pattern, and with the same instincts as other beasts. When caught in his theft he acted precisely as your dog would do under similar circumstances—he ran into the bushes.

The Garden of Eden was, by this same account, without a house, without a mechanical tool; for the Creator, though he could make a man, did not make a spade or a hatchet. It had wild animals in it, and, as it was Adam's business to subdue it, it evidently was liable to be a wilderness of a common sort. Here Adam and Eve, both naked, without towel or comb, without house or fire, with only raw food and their fingers and teeth to pull it in pieces, with only leaves and brush to sleep on, and only caves or hollow logs to shelter them from storms; with no domestic animals, no sheep, nor cows, nor even dogs; but with a probability of being exceedingly filthy and unkempt as to hair and skin—here the story shows us Adam and his wife. The Biblical account is exceedingly fair, but we have been unaccustomed to reading it literally. Inspiration needs to be inspired by the reader to make it conform to modern ideas.

Now, if I am not mistaken, science has found just these same personages. Geology divides the eras preceding our own into eocene, miocene, and pleistocene. By unmistakable evidence the climate of the pleistocene, or latest of these periods, was very variable. At one time the reindeer and Arctic fox and polar bear lived as far south as Italy; at another time the hippopotamus and elephant lived as far north as England, or even Siberia. These vast changes of climate are supposed to have been caused by astronomical changes that rolled great glaciers down over the northern hemisphere, then, after a lapse, sent back tropical flora and fauna, nearly to the Arctic circle. This era is called the age of the river-drift, and in the remains left of its passage are found relics of man. I will not say that before this there are no positive evidences of human beings. Many investigators are sure that we can fasten upon indubitable evidence of a tool-maker several hundred thousand years before. Two and a half million years are supposed to carry us back none too far to find an anthropoid link between man and ape. But at the comparatively modern date of the river-drift—one hundred thousand years ago—there was certainly a man. His bones are found, and with them stone implements most rudely shaped as choppers, scrapers, and pestles. These remains are scattered through Africa, and all the way from India to Great Britain. All that can be said of these people is that they came from the southeast, and were the most forlorn of wretches. They had no pottery, no agriculture, no houses, no tools but of rude stone, probably no fire, and were badly fitted to cope with contemporaneous animals. They were certainly as low in rank as the very lowest savages now existing. The cave men, who came after them, a race from the northeast, were as much superior to them as Bostonians are superior to Comanches. They were not even shepherds, but purely hunters and fishers. Physically, intellectually, and in their environments, these men were perfect Adamites—closely similar to the man and woman described as living in Eden. They were possibly the direct family of the first creature that had so decidedly crossed the structural line that you could say this is no longer a beast, but a man. Here science finds Adam, and so it describes him. He is a being so much more like the anthropoid apes than he is like the railroad builders, or the Darwins and Emersons, that we shall have no uneasiness if compelled to trace our ancestry a few links farther back into mammalian regions.

The history of any degree of civilization runs back only from eight thousand to ten thousand years. Civilization, however, implies some thousands of years of a preliminary sort. This leaves us possibly at or near the origin of the present great races of the earth—the Turanian and the Aryan. We must imagine vast ages of time still antecedent to all this, in which man existed as a dull savage. When we first find his remains he has already run over the earth in spite of climate and animals.

So, after all, science and revelation seem to have come upon the very same identical Adam, and the contest is only as to whether he was made or was developed. Is it not a pertinent question to ask, if a Creator, all-wise and absolute, had been about to do a direct and wholly divine work, would he not have made a Plato to begin with, or a Goethe? Certainly, if his object was to glorify himself. But could he? Can wisdom and moral power be created? You know that human wisdom of to-day is altogether the result of toil, superadded to the inherited toil of our ancestors; and we are more sure of no one thing than that moral goodness is also an accumulated power in human history and individual history. Righteousness comes only as a result of right choices; it is nothing else than a result; it is uncreatable. Adam, as science finds him in the old stone era, without house, or arts, or clothing, or fire, had just the wisdom and righteousness that the descendant of apes would have been likely to have had. If a Supreme Creator really did make this Adam, leaving him more helpless and hopeless than if he had been born in a monkey family with a bit of parental tenderness, the fact does little honor to either Maker or man. For nothing is more certain than that the axe, the plow, the hoe, the reaping-hook, the alphabet, the press, the loom, the anvil, the lamp, the metals, the tools altogether, and every aid to civilization, to comfort, to even decency, are the devices of man's own slow accumulation. The Biblical account of Adam is at best that of a pitiful creature, naked, ignorant, without tools, without moral instincts, a thief, a coward, a liar, a creature who must have sheltered himself in logs, and nested in leaves. The poetry of a-garden will not conceal the naked wretchedness of the inhabitants.

Science and revelation are for once in admirable accord. They have both found Adam, and their pictures of him are identical. The question to be decided is, Did God make this creature out of hand as a special honor to himself, or did he come about as everything else before him, and quite as certainly since, by evolution? Evolution went on for—at the least—one hundred millions of years previously; it has taken charge of life since that; did it fail at that point?

You have found Adam; did God make him? Are you prepared to attribute this special work to Absolute Omnipotence? You see the question is not, Did God make Longfellow or Milton? We can account for them as descendants of our cannibal forefathers. It is not inquired whether a special creative act was necessary to account for Socrates and Plato, for Shakespeare and Ben Jonson, for Homer and David, for Buddha and Confucius, but did it require a divine extra-natural intervention to bring about the dibbling savage of the pre-glacial Garden of Eden? If you will apply Calvinism to such a race it will lose much of its enormity; for, if the Maker decided to elect only a few of such creatures to eternal life, it was probably the best thing to be done.

It makes but little difference in which direction we go, whether from the ape manward, or reverse our footsteps, we find a vast middle ground, occupied by a being who is the progenitor of the human race. Nor does it matter what we call it, man or ape; it is Adam in either case. When you have got to a monkey that, by force of circumstances, is compelled to use his wits for a living, so that the force of Nature no longer goes to the development of body and limbs, but to the enlargement and adaptability of the brain, you have reached man. Living with the snarling hyenas, gnawing bones with the cave-bear, in all probability a cannibal; building no houses, no ships, clearing no forests, draining no marshes; without a road, but following the trails of animals, lived Adam. But by slow stages he moves this way. Is it for two millions of years that he is man-monkey? or is he monkey-man? Call him as you like. Wrapped up in that greatest of all achievements, the discovery of how to kindle a fire, lay the germ of your telegraph, and telephone, and railroads. Is it a divine propulsion that touches the convolutions of his brain? Is it the sweet breath of a God that fans his first fire? Is it a supernatural Father that chips his first flint? No more, I think, than it is a divine life that from first to last propels the eternal whole; no more than it is a special supernatural intervention that appears in Edison, at Menlo Park; or that, in the brain of McCormick, devised the reaper.

We now part company. We believe this Adam of science and of Scripture grew, and was not made at all. He constituted one of the links in the development of life, and, *par excellence*, is the missing link. In a preliminary way, bear in mind that whatever else may be said of Adam he is a mammalian vertebrate. All the back-boned mammals are constructed on one general pattern; man, monkey, deer, horse, whale, are all outgrowths of one idea—two pairs of limbs joined to a skeleton that has within it a battery of nerves, and at one end of the column a collocation of nerves in a bony case, serving as a seat of sensation and dominant perception. Man only has a larger brain and his fore-limbs free, while he rises to walk as a biped.

Note, also, that Nature in her whole animal evolution had involved a slight preponderance of development over reversion, and of progress over degeneration. Given life, therefore, with this element of gain in structural adaptations and higher functioning, and man must be finally an accomplished fact. You must either put an end to the evolving development in the vertebrate line or you will surely get a biped ; and an end to brain development or you will surely get a predominant cerebrum.

Note, thirdly, that some structures are what you may call unsettled, that is, extremely susceptible to the effect of environments ; and such organisms are liable to produce, at any time, startling novelties. The ape is precisely such a creature. It is an unsettled type ; as we say of a cross-bred plant or animal, "hard to fix." It is certain that many issues or varieties of the stock were wholly lost, and among the lost were many that resembled man more than any kind now living, or known as fossils. Meanwhile man's structure does not differ from some of the known apes more than they differ from each other. The lemurs, or half apes, differ from true apes more than some apes differ from man. It therefore follows that man, if a natural evolution, will be likely to resemble in general terms the whole family, but specifically no one of them. He has the wrist-bones of the gorilla, the proportionate arm-length of the chimpanzee, the liver of the gibbon, and the features more or less of other varieties. The general plasticity of the whole family would lead to a vast number of species, and such a variation as the anthropoids might well be expected.

The very word anthropoid, used to describe the higher apes, suggests a natural link ; that is, the ape is often man-like, both to the casual observer and to the comparative anatomist. It is an undeniable fact that were man extinct on the globe, and his remains found by some intelligent being, he would be classed as an order or suborder of the general primate family of apes. Haeckel enumerates twenty-two links, which, in his judgment, can be anatomically established to make the connection complete between the ape and the human. The embryo of the human infant, passing through the stages of development of a lower sort, last of all resembles the ape. Nor does it lose this likeness before birth. It may not be a pleasant fact, yet it is a fact, that our babes are distinguished for some time after birth by the prominent abdomen, the incurving thighs, the undeveloped nose ; and, until just before birth, by the hairy bodies peculiar to the ape. But as the babe develops it moves away from these characteristics, while the ape in turn moves farther away from the human. The closest approximation, the converging point, is somewhere just before birth ; that is in recent past evolution.

Once more note that the human being that degenerates moves directly back on the simian line of form. The idiot has a retreating forehead, prominent teeth, claw-like hands, and very frequently a hairy body. His language is an ape-like chatter, and his anger a scream almost exactly that of the monkey in the forest.

The case is not different with wild races ; whether we consider those that are undeveloped, or those that are degenerated. Their foreheads are retreating ; their bodies covered with hair ; their language simian ; their eyebrows flexible, and eyes restless ; abdomen protruding, and arms longer in proportion than in civilized races. This is proportionately true of all races as we advance from the wildest to those of highest culture. The man of whom we think in our ordinary discussion of the human being, is a person in very small degree natural, but almost wholly a product of culture.

Extremely interesting, as a representative of a stage much higher in evolution than the primitive, nor yet the earliest and oldest type now existing, are the Ainos of one of the Japanese islands. These people do not seem to be the product of degeneration, but were arrested in development many thousands of years ago—probably not less than ten thousand nor more than twenty. They are, doubtless, a fragment of the great race of Arctic men that originated in the Glacier era, and still remain in largely a primitive condition as Esquimaux. The Ainos, by depressions of the Northern Pacific, were isolated on islands to the south of the main body of their race, and thenceforth became somewhat modified by a milder climate, and later, by the neighborhood of Mongols and Aryans. They have lost the nomadic character of the Esquimaux, but in other respects are probably less changed than the rest of the race. They stand about five and a half feet high, are well formed, their leg muscles well developed, and their bodies exceedingly hairy, often being well provided with a soft, black fur of an inch or more in length. Their voices are soft and musical, and their language abounds in the click characteristic of all primitive and simian language. Their nostrils and features generally are open and alert, rather than introvertive and intellectual. They have no wars, as is the case with all the Esquimaux; for war is an evolution belonging to the tribal life, while the Ainos have not advanced beyond village communism. Each village is a family and alien to others. They are strictly honest, recognizing the rights of property precisely as animals do. Nearly all forms of property, not in use, are common property. Their vices are religious rites, as is the case with all primitive races. They drink *saké* enormously, but it is to the gods, as the earlier Greeks had impure religious rites. The explanation seems to lie in the supposition that exhilaration is exaltation of soul and divine. Their nerves are relatively very dull, like all low races, and find excitation only by the hunt and bloodshed, or by intoxication. The fullness of their leg muscles places them above the Australians and Polynesians. I have stayed to describe this curious people, not that they are the only link between civilized man and anithropoids, but to show that wherever we find primitive races we find animal characteristics. It remains only to add that the Aino is as a race incapable of progress; his brain, though large, is stayed at the childish stage.

The general effect of civilization is to retreat the jaw; bring forward the fore-brain; bridge and elongate the nose, while closing, in part, the nostrils; bring the chest forward, and retire the abdomen; shorten the arms, and make the legs more muscular. To sum up, the tendency is to deanimalize the organs, and to create an intellectual type; with the general contrast that a savage is an outward-looker, alert in his senses, while the civilized man is introvertive, subjective, and his senses are subordinated to reflection. The savage sees nature; his successor sees himself. The proper study of mankind thus gets to be man.

The skull of primitive man differed, as I have before mentioned, in several points from that of man of to-day. In capacity, the earlier skulls are fairly classed as on the road from ape to man. The data are very incomplete; and that which is secured is of a character so uncertain that we can only be sure that brain-power in primitive man was decidedly simian. But how about the tail? It was said substantially by the earlier opponents of Darwin's views: "Show us the tail, and we will believe." But this trouble has about vacated all literature. Anatomy shows that the embryonic man is in reality a tailed creature. Prof. Fol, of Geneva, says that by examination of many embryos he found, at four weeks of age, four vertebræ which are afterward fused so as to leave the normal number of thirty-four. There is no doubt the appendage was aborted in the effort toward conditions of life not needing it, as it was created by effort toward a life that required it.

In placing man, however, we have not only to consider his immediate progenitor, but the links which leap over the simian ancestry and establish connections more remote.

In the eye-teeth as shortened tusks is a decided link with the swine. When we sneer, it is with snarling muscles of the dog; that is, we draw up our snarling muscles and show our tusks—a threat of no small import, considering that we bite with our tongues in these days, and our pens are the nibs of our tusks. Beyond this, in toes, in teeth, in wrist, in ankle-joint, in heel bones, in short heel, and otherwise, we are classified with special progenitors. On the whole, our organism is far less finished and polished than that of certain other mammalian lines, showing that the push toward brain, and the exhaustion of energy on head functioning, has gone on for a long time. Neither are our senses at the highest, except as servitors of the cerebrum. Our immediate ancestor was neither strongest, nor swiftest, nor best-knit of animals; neither did he have the keenest scent, nor the acutest ear, nor the eye of longest range. He was compelled to betake himself to trees, and rely on wit. His forehead pulled him through.

Concerning the discoveries made on our own continent, Prof. Cope said, in 1885: "We have obtained the long since extinct ancestor of the very lowest vertebrates. Then we have discovered the ancestor of the true fishes. We have the ancestor of all the reptiles, of the birds, and the mammals. If we consider the milk-givers separately, we have traced up a great many lines to their points of divergence. In 1874 I foretold that the ancestor of all the mammals would prove to be a pentadactyle plantigrade bunodont; that is, be five-toed, walk on his whole foot, and have tubercular molar teeth. In 1881 the prophecy was fulfilled." Such a type of mammals was discovered in the Eocene rocks. This group, called condylarthra, proves to be the ancestors of all hoofed mammals; not only of these, but of the lemurs, and monkeys in general. But the discovery does not end here; for to this group can be traced also the lions, tigers, wolves, bears. Prof. Cope is our ablest American investigator and generalizer in biology.

His story is so fascinating, I should like to give you the whole of it; but you must take his authority, that there has been discovered a common ancestry to all included in the above list. Millions of years ago the struggle for life went on. Some creatures succeeded by running; some tried to climb; some fought with foot and teeth. Slowly the runners developed a *power* to run; the foot, generation by generation, became more adapted to fleetness, till at last the ever-ready-to-run creatures stood on one toe, as the horse does to-day, and aborted the rest. Those who fought developed toward carnivorous teeth and feline claws. Those who took to climbing grew powerful to cling by foot and tail; but by so doing the feet became hand-like, and the tail, specialized to a single use, was prepared to be aborted when that use was ended. That was not all; these climbers must grow more erect — the brain must become the crown instead of the fore-end of the creature. Compelled to shift by hiding, wit gained slightly in preponderance. So your condylarthra at last became in one direction the horse and antelope; in another, the tiger and lion; in another, the two-handed anthropoidal creature, moving on the direct line toward man.

You have only to bear in mind that the manner of life resorted to by the simian line of creatures must eventuate in making preponderant in structure two parts, the hands and the head, while it is in just those two directions that man gains his supremacy. He is the creature with big brain and pliant hands. In the first resides his philosophy, in the second his mechanical power, while by the co-operation of the two, sciences are born. All other animals that have manifested marked intelligence have not only large brains but some partial equivalent for the hand. The elephant has a remarkable substitute in the elongation of his lip and nose. The horse, following the line of toe development; the stag, that of foot and horn; the carnivora, that of tooth and claw, could not attain high intelligence. They lacked a compensation for the hand. The anthropoid, instead of tooth and foot, moved off on the line of brain, and made the most of it. But man would have been impossible before the hand. The monkey must take to climbing, and give up walking with his fore-limbs. Afterward, induced to descend and live permanently on the ground, he retained the tendency to bipedality.

One thing more remained as a necessity before the brain and the hand could bid farewell to animal servitude and begin the work of mastering the problems of the universe; that was pliant vocal cords, capable of begetting language. The brain, the hand, and the tongue are the trinity that presides in the realm of humanity.

All the history of the striving and toils that eventuated the condylarthra in an anthropoid none will ever know; nor will the possibly longer and more difficult process of transmuting the anthropoids into true men ever be fully unraveled in all its minute stages of change and progress.

However, we have at last what we may call the great condylarthra family, with structural forms all converging in a plantigrade bunodont with five toes. But, if this be so, we are pretty sure to have a family likeness of a subtler sort. There ought to be certain common instincts, establishing a common origin. I think we have precisely that confirmation, for all the creatures which we have grouped as the condylarthra family have a common language sense. There is a possibility that your horse, dog, cat, the elephant, the lion, etc., shall communicate by a natural language of gestures and sounds. Of course, articulation is not common; but, for yes and for no, assent and dissent, for love and for hate, for anger and for good-will, for shame and for jealousy, there are in all this vast family common and mutually understood signals and gestures. A lover of animals will not fail to discover this possible lingual and general intercommunication between himself and a horse, and all other domestic creatures that come within the limit stated; and he will probably have learned to talk with his cousins intelligibly. Nor is this all; the consonantal sounds of *m* and *b*, which underlie the cries of our babes, are precisely those that are uttered by a very large number of the condylarthra descendants of other lines. The bovine family in general, and the ovine, utter identically the same cry as the human child. The child, later, softens *b* into *p*, and lays the basis of his social relations in mamma and papa. But with the insect tribes, the birds, the saurians, the fowls, or any family outside of the Tertiary mammals, we can not find any such commonalty of lingual elements. However, there is a more generic sort of language, wherein joins a very much larger range of creatures. Music, or musical notes, constitute a language to some degree comprehensible by almost the whole animal family.

I am aware that a few of the ablest biologists still refuse to accept of evolution as covering the whole ground. They are willing to consider development by a natural process established over the whole field until man is reached. But here they believe that they see the necessity for a special divine extra-natural interposition. This, in the main, is urged on intellectual and moral grounds; but Wallace and Mivart urge it also from considerations of man's structural capacity. Man, says the former, certainly is not merely a creature adapted to his environments, but he has powers folded up in him ahead of environment, powers that will not be called out in a thousand years. For instance, he cites the vocal cords of the earlier man, which were every way fitted for fine music, yet the savage does not sing; he only howls, and conceives the most horrid raspings to be music. It may be answered that the vocal cords of an ordinary audience do not differ largely anatomically, yet it is terribly apparent that their music does. If these cords were a special creation, then they generally come short of their purpose. But since Wallace wrote it is more clearly understood that mostly savages are degenerate, and have aborted functions of all sorts. When we think of the amazing capacity shown by low races to put other parts of the frame to a degenerate use, we need not wonder at their use of vocal powers. However, where can you go that you do not find an instinct for music? All nature is full of it. Every insect loves it in some form. The cat sits at your feet purring; fishes will follow a flute; there is even a musical fish; the birds carol from pure love of sweet sound. There is, no doubt, also a vast range of music not perceptible to us; for our ears are quite limited in their power to receive notes. Lie down on a sunny knoll in July, and you will be surprised to find the air at an indefinite distance above your head full of an insect music you had overlooked while not specially attentive. But are we sure that the lower races are not more musical than the higher? It is certainly true of the black race, that it surpasses the white in this special power. The ear as well as the vocal power is marvelously developed in them. Music is their instinct. It is not a matter of culture but a spontaneity. Besides this, it is more than probable that primitive man's first sounds in the way of language were chanted, call it "sing-song" if you choose; and for untold ages every effort at culture that the world saw was in the way of rhythm. Poetry always preceded prose. It does with children now. It is more easily remembered. It taxes attention less. Prose is too rugged, and has too many angles of observation. Memory is always aided by the tread of metre; and those early fellows had no books; all knowledge was stored up in the memory. No one loves color and brightness like a savage; none are so charmed by music. That this is as degenerate in accord as their lives are degenerate, is true. The vocal cords and the hand of the savage are really *fully* used, but not for all possible purposes. His brain is fully used, and is not an ounce too large for the pressure that evolution puts upon it. Development is harder work for low races than for higher. That is, it was harder work for Adam to get comfort out of existence, and make a little progress, than for his modern descendant to go a great deal faster. To learn to kindle a fire, to chip a flint, needed as much brain and hand as we require for vastly higher work. Prometheus, who represents the first man who by friction made a fire, needed relatively more genius than Franklin or Edison.

But Mr. Wallace's argument also proves too much, for not only is it true that man in a savage state has a brain capable of work that he never does, and cords that do not sing as well as they might, but it is true also of a wild canary. He never sings in his wild state as he does in our cages. A cat-bird is just now whistling and caroling and laughing on the vines over my head; but cat-birds in a wild country do not ever sing as they do in our companionship. The dog that manages to express love, hate, anger, amazement, pain, excitement, delight, desire; that comes near to laughing; can thoroughly engage in a game of ball; this dog in a wild condition does not even bark, he can only howl. A sparrow is capable of being taught a great many curious performances, to sing finely, and even to enunciate words; but in his wild state he never sings at all. A recent writer says: "The language of birds has grown from rude beginnings to its present diversity; and whoever lives a century of millenniums hence, will listen to such music as we in this day can only dream of. Here and there is born a master singer, a feathered genius, and every generation makes its addition to the glorious inheritance"; but no one imagines that anatomy will be able to trace any appreciable changes in vocal cords. So if Wallace breaks the chain at man, he has broken it all along, and there is no chain at all. But he has not done this by showing that that which is adaptable to lower uses is also to higher. It is true of everything in Nature. The diamond is adapted to flash light, but it may be forever buried in the soil. The electric current, a terrible destroyer until recently, was for all those ages capable of purveying intelligence.

But in this argument we must never lose sight of the fact that the intelligent evolutionist not only believes in evolution, but in evolution as an aim; that is, while denying the doctrine of special designs, he does not deny the presence of eternal purpose—an intelligent will in every particle of the universe. It is a faculty of the universe. The argument of Mr. Wallace assigns to Divinity the meager part of writing Nature's appendix. He is not reached for billions of years, but at last is allowed to supplement what is done. He does it by putting into an ape a few brain convolutions, vocal cords, and remolding his hands and feet. The consistent evolutionist identifies Nature and God; for Nature is not dead, but is that eternal process and life, or life-law, which we now study.

I am inclined to think that the facts used by Mr. Wallace really tell strongly the other way. For in all the evolution we have traced there is not only a line of links that we can trace backward, but at each step there is a prophecy of something to come. When the ape rises to his feet and begins to use his fore-feet as hands, anatomy sees a larger adaptation as possible; a more erect posture, a larger brain, a less curved vertebra, and the abortion of such parts as are not needed. The work is prophetically done. The promise is as real as what has been accomplished. Taking man as he is, he infolds other prophecies and potencies. The powers are already his not yet called forth. How grand is the heroism and the executive force of a Grant while building a "hard-scrabble hovel"; it will, however, never be manifested to the world unless a war occurs to call it into action. You are confident that faith is often certainty—it shows that which is to come. In man, as he is, we feel assured there is a potency yet to be summoned forth that shall confirm our hope of immortality. The universe about us is in every atom capable of being correlated into mind-food and mind-power; we do not doubt the correlation will take place.

But the farther back we trace life the less determinable are moral hints, and more patent are the structural prophecies. The sponge not only lies in a neutral ground between vegetable and animal existence, but it contains a promise of the animal kingdom. In the yearning arms of the vine, in the carnivorous taste of the drosera, in the shrinking of the sensitive-plant, in the sexual desires of the trees, in the friendships of certain plants, in the instinct that follows the sun, in the movement of the rock-rose, traveling leagues for water, we have premonitions of the more differentiated powers of animal life. All such hints have been fulfilled. No outreach or yearning or hope, of tree or plant or animal, has remained ungratified. The chain is not only one of positive structures, but of equally positive premonitions. Man stands to-day full of prophecies—inspired by hopes, more full than all else of ambitions. What may be argued concerning his hopes, when we consider the past, I leave you to judge. What shall be the evolution that links us to the future is beyond my present topic, if, indeed, it be not beyond the power of man to read. Suffice it for the present, that, so far, life has from the outset been interlinked, not only by fulfilled facts, but by prophetic certainties. When a functional potency exists, with a desire and effort, organic change must ultimately ensue. It is not because man has vocal structure that he speaks, but the structure must be preceded by desire to enunciate.

But, if evolution has wrought what is claimed by its advocates, how is it the negro has remained essentially unchanged for five thousand or more years? The answer is simple. The negro stock was fixed at a low animal point, and no change of environments has ever occurred to break up the type. Such a type is the result of a climate hot, sensuous, indolent; and a life full of dangers; a climate united to melody, lust, and voodooism, but not to industry and aggressive enterprise. But history demonstrates that the negro, transferred to a climate not too sharply contrasting with that of his native habitat, and placed under hospitable and stimulating influences, is subject to a rapid change intellectually; while his features correspond to the purpose within. But the negro is not as adaptable as lighter races to a wide range of climate. He is of all human types the least mobile. As with wild fruits, so with wild races; it is difficult to break the established structure and instincts and habits, both physical and mental. Nor at any time does a whole species break away from heredity and advance. Of the four-toed horses only one or a few manifested the tendency to abort one toe; but the advantage lay with those few. So a special type of mankind may remain for tens of thousands of years essentially unchanged, while out of the side of it moves off a plastic, aggressive, modifiable family. So the Aryan family broke away from established uniformity, and so have on many occasions branched out families of the black race.

This is the story of the missing link; Adam looking backward and looking forward. As either an organism, or a purposive character, he has not been exempt from the universal laws, descent, survival, progress, and degeneration. If, however, there was the special intervention of a Creative Power, let us gracefully recognize the fact. He made man in the image of the ape. It is only a satire to say of any primitive type of man that he was made in the image of God.

Evolution does not deny that in us is the revelation of Infinite purpose, nor does it cut us off from hope beyond that of our animal inheritance. It reveals only our immediate origin; but there is in us a heredity undeniable of a sort not wholly animal. If man has come up from the cave, where he prowled with the hyena and the bear; and if he has left an ancestry of arboreal antecedents, until his brow reflects the dawn of eternity, may he not wisely believe that before him is his real destiny?

LECTURE IV.

ANIMALS ON THE ROAD.

MR. DARWIN allows that between the highest animals and the lowest men there is still a broad demarkation in moral and intellectual quality. The comparison should, of course, be drawn between prehistoric man and animals as they then existed.

For nearly the whole period of man's career, his development was so slow that he was but little unlike the animal world out of which he was rising. But rise he did, and while rising he depressed the rest of the creatures about him, so that the demarkation constantly widened; and what Darwin says is true, if rightly understood. Apes show some degree of individualism, but the law of animal life is mental uniformity. Men, for ages, were nearly uniformly developed. There were no great thinkers, no great hopers. But when a bigger brain did appear it mightily shaped the destiny of those about it. Human progress, doubtless, began in this way. The dimmest dawn of history brings us the mythical names of great reformers. So, out of animal uniformity, slowly grew up intellectual dissimilarity. The primeval law of variation involved heredity in leaps over great chasms; and these chasms occur not only in structural evolution, but where, by untraceable causes, out of the side of humanity springs magnificent genius. Genius is an ancestral tendency come to its flood in a special individual. So the demarkation widened, and man became less an animal.

Has man, in this new life, really become possessed of new powers, or is he only endowed with the essential attributes that belong to all life, but more highly differentiated? However that may be, we are certainly only on the king's highway to sound reason and pure morals. Are the animals not on the same road, only at indefinite distances behind us? Association with animals will intensify the conviction that they are possessed of the lower stages of both reason and morals. There is no reason for doubting that, if St. Bernard or shepherd dogs were as carefully bred for intelligence in other directions as in the special lines where their power is shown, they would develop with considerable rapidity. The Jersey cow is by no means the stupid bovine of our old-time barn-yards. I have seen them when, only for lack of articulation and hands, they were wiser and nobler than the men that fed them. Returning from the West, one summer, to my vacation home, I found my pet Ayrshire calf had become a mother. But such a crazy creature it would have been difficult anywhere to duplicate. Those in charge drove her into a tight-fitting frame, and tied her head; while stout wooden pins were inserted before and behind her hind legs. One man then approached gingerly with a pail, while another brushed off the flies. But she managed, for all that, to kick over most of the milk, and occasionally landed a straight shot in the milker. Three weeks from that time I had her standing quietly on the grass-lawns to be milked, without either strait-jacket or ropes. I used firmness and kindness, but in fact argued it out with her. She soon saw that the road to comfort was the road of decent behavior. The men in charge had taken her on the brute level, and there she came out ahead.

Give vocalization to your horse and he would shame you out of a good many bad ways. He manages to do so even now, under great disadvantages, having a fine range of gesture language. Still, the evolution that is to be expected is rather on our own side, that we, through moral sympathy, shall learn to talk their languages, not they ours. Trace man and his language as far back as you can, and you find his speech loses all its idealism and concerns itself with purely physical wants. In that condition it is animal in its nature; a merely animal dialect, guttural or hissing. The babe always begins with the same consonantal sounds that characterize lower creatures—*b*, afterward softened to *p*, and *m*; and, soon after, *k*, which in time is softened to *ch*. On the other hand, the dog that when wild does not bark, in man's company learns to enunciate a score of sounds to express emotions and wishes. The parrot gets fun out of his chatter. The horse will surely talk with you if you always talk with him. It is a glorious animal for a companion. Monkeys are said to comprehend much that is said to them. But I have seen dogs, and horses, and cows that not only understood a good deal, but managed to convey intelligently their affections and wishes. The range of expression belonging to the lower castes in our more wild sections, and the lower grade of immigrants, is less elevated and broad than that of a pet cat.

An intelligent child, while learning the art of speech, uses the same approbative and disapproving sounds as adult monkeys. Your cat responds to your tones with nice appreciation of their intent. One or two hens in a flock will show particular aptitude in telling you what they think. Some horses have an octave of sounds, and express very nice gradations of dislike and pleasure, up to defined laughter. I have had one rooster that had a remarkable power of laughing. No one could hear him without laughing with him. Vocalization, however, is not specialized wholly to the tongue in men or in beasts. A dog has a defined laugh all over him, and his tail talks the higher classics of affection and gentlemanly good breeding. As the tongue gets to wagging wisely the tail decreases in importance and aborts.

All animals can talk; if you but deign to learn
Their languages; not ask their tongues to crook to yours.
Yon sheep, with soulful eyes, calls out a morning bleat;
The cow forgets to low, and in expressive tones
Gives welcome to her friend who fills her shaded crib;
Looks round to kiss your hand, and bends her dainty head
For your salute. Rub softly 'twixt the friendly horns.
In yonder stall, with modulations of a mind,
Your horse impatient calls; or laughs with hoof and tongue.
Go in and rub his satin hide, and tell your love;—
The jealous lamb crowds close, and thrusts his head between,
To claim your hand upon his woolly pate; then whisks
Away, with sudden thought of clover in his box.
Nor are your fowls such dullards as you dullards think;
They put in speech each subtle passion of their lords;
Hope, expectation, pride, and happy thankfulness—
Their plans they tell; achievements boast; then round and round,
For lack of audience, in corn-field and in clover,
Tell o'er their bravest deeds, and punctuate with worms.
Tones are speech—not artificial words that bear
Your language, as a barrow wheels your gathered corn.

This matter of language is very important, for it is undoubtedly the first requirement in evolution in passing from the sensational world to the world of reflection. In man's language, at its lowest, there is at least a trace of abstraction and comparison. But I am sure that in animals of the higher grade there is also a trace of the same thing.

Besides the germinal power of conveying thought, animals unquestionably possess courage of a moral sort, judgment based on comparison, pride, love of music, humor, memory, order, fun, sympathy, fidelity, conscience, and foresight.

A mare that I was driving fell upon some concealed ice. She struggled bravely for a long while to rise, but at last gave it up, entirely exhausted. By severely overtaxing myself I gave her the help that saved her. She never forgot it. Whenever, after that, I entered the stable, she looked after me with a tenderness that made her forget her food; and if I entered her stall, her head was laid on my shoulder, or her nose thrust into my vest.

This same creature afterward gave us an illustration of observation, judgment, memory, and trustfulness. My brother was using her to haul wood. He was obliged to go one mile over the hills in deep snow, and on a cold day. Reaching the bars, the path led across lots and through a deep, wild glen, then up the hills, and by a special track to a pile of wood, among many others belonging to other parties. The sleigh-tracks led everywhere, and crossed frequently. My brother having discharged a load at the house, left the mare for a few moments, while he stood by the stove. When he went out, she was trotting over the top of the hill, a quarter of a mile away. He followed, but found that she had carefully followed the right track, to the right pile, and, turning, had backed the bobs into position for another load. When he reached her she gave him an impatient neigh, that seemed to advise him to keep himself warm by work.

Bayard Taylor, whose big heart was full of sympathy for animals, tells us they do not forget the speech of the lands where they are born. Noticing a hippopotamus in Barnum's Museum that looked dejected, he spoke to it in English, but the beast did not stir its head. Then going to another corner of the cage, he said in Arabic, "I know you, come here to me"; the creature at once turned its head and listened. Taylor repeated the same words, when the beast came to him, and rubbed its head against the bars, and looked in the face of the speaker with evident delight. The creature was probably homesick, and a sound that it had heard in its native land was vastly comforting. "What," says Taylor, "is more tragic than the yearning helplessness of a dog that understands but can not answer!"

A distinguished English poet was once walking with Kingsley, when an immense mastiff dashed at them, trying to wrench his chain loose. The poet ran; but Kingsley said, "Wait and see me subdue him." The dog was on his hind-legs, foaming with fury; Kingsley stepped near, and lifting his hand said, very quietly: "You are wrong. You have made a mistake. You must go to your kennel." The dog dropped on his four feet but still growled. The Canon repeated the same words, and advanced as the dog retreated, until he lay down in his kennel, convicted of his blunder.

I have a friend of the pug breed that is extremely fond of a game of ball, and his intelligence is decidedly superior in the game to most children of eight years or ten. A case was reported of a similar dog whose ball was kept in a drawer. After unavailing efforts to pull the drawer open, he went under the desk, and pushed it out; then came out, and secured his prize. Dr. Loring, who ought to know better, says: "A cat is a cat the world over, let the mistress be what she may. A dog is a dog in season and out of season. A sheep is a sheep, and no circumstances can modify its sheepishness; a cow is a cow, the same board-faced machine." But he condescends to wonder at a horse. Homer could find no finer simile for the eye of the Queen of Olympus than "ox-eyed" Juno. I should like to have my Jersey "Grace," and her daughter "Topsey," put the doctor to shame with a look from their magnificent eyes. A lame ox in Gloucester had been turned out to grass, but he broke his pasture, and made way to the blacksmith's shop. Here he took his place in the shoeing-frame, and held up his crippled foot to the curious smith. The difficulty was a small stone under the shoe. This was removed, and the ox went home. The surgeon Moraud, of Paris, who had a friend whose dog broke its leg, set the limb, and cared for it till well. Some weeks afterward he heard a scratching at the door. Opening it, in walked his old patient, and a comrade with a broken leg. Dr. Barnum, of Louisville, Ky., reports a very similar case. The patient was a black-and-tan terrier that resisted the doctor to the utmost, but was finally bound up. Four days later, he came of his own accord alone to the office, and had his bandages arranged. After that he appeared once each day, and held up his leg for examination. I have never seen any such case among dogs, but I once owned a hen that would come to me in trouble, and with persistent ways insist on my help. On one such occasion, the difficulty was a thorn in her foot.

A writer in "Nature" gives some remarkable illustrations of intelligence among elephants. On one occasion he observed a young one go to a fence, and, pulling up a bamboo stake, break it in pieces, but he threw them all away. This was repeated, until he secured a piece that seemed to suit him. This he passed under his arm-pit, and began to scratch. Down fell a great elephant-leech, six inches long, and which, without a scraper, could not have been dislodged. The writer adds that the custom is an established one among elephants, and that they will also break off long bushy branches, strip them neatly down, and use them to whip away flies.

M. Fischer says of the Rhesus that it knew perfectly the names of each of sixty animals kept in the same apartment. A gentleman assures me that he knew well a dog that readily went to any room in a hotel to awaken its occupant; the room being designated by his master.

There are no races in the world equal in interest to the sheep-dog trials at Llangollen, in Wales. In the first round, at this year's trials, each dog had to manage three sheep, which were turned out on the top of a hill. The dog had to take them around a flag, through a gap in an iron fence, then through a hurdle-gap; then get them into the pen, all in ten minutes. Among the rest, Handy finished his work up in admirable style within five minutes. In the next trial each dog must manage nine sheep, and at the last three of them, with red marks, must be penned separately.

Jet succeeded in doing this within ten minutes; others did nearly as well.

I have often in my boyhood gone into a blackberry-field with a favorite dog that had learned, without teaching, to pick and eat the berries. He was very fond of the fruit, and his method of picking was to carefully draw back his lips and take off the berry with his teeth. His love for fruit thus growing on him, he took to eating pears and currants. The latter he drew carefully from the stem with partially separated teeth, leaving the stem on the bush. This change of diet grew upon him until he ate corn from the ear, and became sometimes troublesome from stripping green corn in the field, or even dry corn from the crib.

M. Pouissielque tells us that in Florida he was entertained by a gentleman who had as servant a monkey, about four feet in height, dressed in white trousers, a red vest, and wearing a cap. At a signal from his master he stuck a napkin under his arm, and laid the table. "He then," says the narrator, "waited on us, doing everything himself more rapidly than four negro servants would have done it." Antonio was twelve years old, a native of the Gaboon. Buffon tells us he had seen a chimpanzee that always walked on its hind legs, even when carrying burdens. "A word or sign was sufficient to make him obey, and his temper was equable and gentle. I have seen him offer his hand to lead out those who had called on his master. I have seen him take his seat at table, unfold his napkin, wipe his lips, use a spoon and fork, pour out a glass of wine, and pledge a health when invited."

I believe the cases are authentic where monkeys have been trained to field-work. Mr. J. B. Parkes, of Kingston, Kentucky, having received a present of seven large monkeys from his brother, at Cape Town, in South Africa, conceived the idea of training them to break and prepare hemp for market. They have learned to do this more quietly and perfectly than the negroes, and at one-fourth the cost.

It required four months of training, but the result has been so favorable that Mr. Parkes has sent for ten more monkeys to be trained for the same work.

I group these cases, not because they are rare exceptions, but as common illustrations of what is now being confessed by all, that animals are very human in their general intelligence. This, however, should be carefully noted, that these are not instances of instinct, but of life-power, that is improvable. Instinct is life-power that has become automatic, or is moving in that direction. Development in that direction has done its work. Reason is consciousness comparing data and drawing new conclusions.

Turn now to the emotional character of animals, and you will find them equally teachable in that direction. The goose, as often as we have had it selected as a type of stupidity, has its friendships, as do other domestic fowls. A Mr. Phillips, living near Nashville, owned a blind horse, which occupied the same pasture with a flock of geese. An old gander, someway finding out the difficulty, attached himself to the horse, all day kept him close company, by cries warned him of danger, and by a kind of perpetual cackle led him to the best pasture, and to water. At night the gander accompanied the horse to his stall, where he received a share of supper. They thoroughly understood each other. One Sunday the horse died. The gander mourned inconsolably, and died before the week was over.

In my stable I see every day a marked affection established between a horse and a pet sheep. Missing my sheep one morning, I found her in the horse's manger. The horse pushed her to one side for a moment, took a mouthful of hay, with which he drew back, and gave the sheep a turn. Always a word of reprimand to Nanny, and she starts for the horse, and under his belly looks out as from a safe place. Nothing will induce the horse to stir so as to possibly injure his favorite.

I have in a previous lecture referred to affection in still lower grades of life, as between the pilot-fish and shark. It would not be impossible to trace a history of friendship, showing the steady growth of altruism from very low down in life-forms. Almost all creatures love babes. A little child is generally safe with venomous creatures. The stories of snakes eating with children are well authenticated. Turtles are said to be capable of forming such attachments. Peder would thrust his head out of his fortress for no one but a little girl, for whom he had taken a liking. She had only to go to the door, and Peder would be heard lumbering up the walk. Reaching her, he would touch her fingers with his paws, and caress her cheek with his queer old head. Cats will allow small children to do with them what in grown people they would sharply resent.

The sympathy of the dog is unmistakably reasoning and altruistic. My father died suddenly in his field, remote from houses. His dog sat down by him, and resolutely fought off all approachers. His hired man was a negro. The dog either suspecting him, or for some other reason, was peculiarly violent with all negroes—refusing to allow one near the house for weeks. A suspicious stranger he took by the hand, holding firmly, without biting, led him into the house, watched quietly till he saw no harm was intended, and then released him and went out. Cats are exceedingly strong in their attachments, if treated kindly. A young man came into my family for the winter. One of the cats displayed for him the strongest affection. After his departure her misery was indescribably pathetic. She restlessly searched rooms and closets, and went from barn to house and house to barn, and to all his resorts, uttering a constant plaint. This she continued to do for weeks.

I own five acres within the limits of a Western city. It is hedged in and fenced, and no intruders allowed that would disturb birds. The whole of it is devoted to choice shrubbery, flowers, and trees. Here the birds soon learned they were safe. The shy wood-dove would sit quietly on her nest, close by my seat, and I would talk with her.

Dr. Whitlock, of California, tells of a bull that suddenly assailed him, and would soon have gored him to death; but a favorite mare and a pet colt dashed up, and with teeth and heels charged the bull and drove him off. The first the owner knew was when he found himself lying on the ground, and the colt licking his face, as much as to say, "We came as quickly as we could."

But for tenderness and refinement of friendship no animals equal those of the monkey tribes. Their love is often so true as to shame the human. At a recent meeting of the German Association of Naturalists, Dr. Hermes described a young gorilla at the Aquarium. He eats what the keeper does, and eats with him. When he wakes, he stretches himself as a boy does. When ill, he shows his tongue to the doctor, and bids him good-by with a squeeze of the hand. He is polite, kind, and never grasping. When he goes to bed the keeper must sit by him until he goes to sleep. Another Berlin anecdote is of a chimpanzee that died of consumption. It seemed thoroughly to comprehend that it must die. When the director of the gardens leaned over him, and spoke kindly, the poor fellow reached up one arm and drew him gently closer, looked him calmly in the eye a few moments, gave him, at short intervals, three kisses, then motioned to be laid on the couch, and, giving its hand to Herr Schaff, it died.

Here, then, are what we proudly term human affections, and human methods of expressing them, in creatures we call brutes. It is quite as easy to find among them what we call human frailties, such as conceit, pride, retaliation, drunkenness, and lust. My silver-spangled rooster I call Dandy, and dandy he is, with affectation added to accomplishment; that is, a pretense of more beauty and goodness than he really possesses. A peacock struts across my lawn, evidently mortified if jeered at. If you have ever attended an equine or a canine school, you must have noticed the pride that the animals manifest in their performances. If you want a horse to do his level best, praise him softly, and let him look for appreciative encouragement. A friend of mine in Michigan owned a horse that would permit no one to mount but herself. But to her he offered himself gently, that she might take the saddle, and, once in her place, it was difficult to tell which the creature most manifested, pride or love. Peculiar hate and distaste are manifested very frequently, precisely as in human beings. A horse will remember a repugnant person for years.

There is no one element of animal character more thoroughly human than love of approbation. When they are kindly treated animals do not differ from boys. Occasionally a vicious temperament, or a vicious family, occurs; this too is human. But let loose on your lawn two boys and two kittens, and in five minutes they will all be climbing trees, hanging in hard positions, and not one of them satisfied without you express your admiration. The dog is still more susceptible to your approbation and satisfaction. But you find your horse and cow are also peculiarly sensitive to praise and blame, although less demonstrative. My horse detests one groom, and while he is near would be taken for a bad-tempered beast; but another man soon stands by her, flattering her, and crawling under her, lifting her "beautiful" feet, and stroking her "bonny" hide, while she puts her nose gently against him, and looks thanks out of soft eyes. Darwin sums up his experiments thus: "Dogs feel shame as distinct from fear, and something very like modesty. Large dogs are magnanimous to small ones. Monkeys dislike being laughed at, and sometimes invent imaginary offenses." Miss Bird says of monkeys that she was not so much surprised at their imitative powers, but at their inventive and originating powers. It is a bit of conceit on our part to claim intelligent displays in animals to be imitations of ourselves.

The more difficult task is to know what to make of the art tendencies and constructive capacities of animals. Van Beneden says: "We find among them miners, masons, carpenters, weavers, paper-makers, and lace-makers, working first for themselves, but also for their progeny." There are so many volumes on this curious section of life-history that I shall pass it by with brief notice. But every day I have in sight of my writing-table an instance that seems to me to combine more of the wonderful than anything that the ant does. A wasp is building a set of mud-cells in my window-frame, all of which she shapes with nice care, and really elegant smoothness, and in them lays her eggs. But, before sealing them up, she catches spiders, stinging them so as not to kill, but always to paralyze, and places them with her eggs, to serve as food for the young wasps when they shall hatch. The larvæ will make good use of this food, and, after they have broken the cells and come out as perfect insects, you will find the spider-bones left behind. Your houses and outhouses, barns and gardens, are full of such interesting illustrations of animal art and foresight. A study of bird-architecture is exceedingly interesting. The oriole's charming and æsthetic effort, combining the idea of comfort and concealment, swings from an apple-bough near my window, while a cat-bird is pulling at the strings that fasten my dahlias, intending to twist them into her rather careless but wonderfully hidden nest of sticks and bark. There are five or six of our birds that pass well over into the class of artists. Their work is not only finely constructed with an eye to use, but is adorned with the purpose of having it beautiful. I have a nest, I believe of one of the yellow-birds, that is covered with bits of lovely lichen from old logs. The nest is in excellent taste, not over-adorned, but showing the refinement of culture.

Watch your cow, even, in eating. She will change her diet, if it be possible, as often as a man. She goes from clover to grass, and then selects a few weeds that are, doubtless, appetizers. She relishes, she enjoys, she likes, and loathes. Man goes farther, for half his pleasure is in the study of his foods—their growth, their beauty, their origin, their precise effect, and their analysis. In the same way the dyspeptic finds his misery.

You must be poorly acquainted with animals if you do not comprehend a universal love of the beautiful. A cow abhors the vile yards in which she is often compelled to live. She will, if possible, select the pleasantest spots for her bed, and where she can face the harvest moon. The prettiest picture of peace is a clean barn-yard in August, when the cows have lain down to chew cud, and you will be sure to find them so lying that they can look at the lunar loveliness that shines in the south.

The fondness of animals for music is equaled only by their dread of harsh discords. This is not only true of birds and fowls, but of the higher-bred horses and cows. A Jersey or Holstein has not a voice like a canary, but she has a fine modulation, and never bellows like coarser cattle. It is easy to know what they want by their tones. An unruly cow will stand to be milked more readily by one who will sing or whistle. A Canada farmer says: "Tim and I used to sing to our cows. They knew when we changed from one tune to another. When we sang sober church tunes, they lopped their ears, and reminded us of the people in the pews who chew cloves and try to look pious, but really are quite sleepy. Then, striking into something lively, we could see a quick response from ears to tails. And when we stopped every cow would turn her head, as if asking us to go on."

I have a place where, in October, I go to sit on the logs, and see the squirrels harvest nuts. Whistling to them, they soon get quite familiar; not so much, probably, from pleasure at the sound as from confidence that my purposes are kindly. So at last they run all about me freely, carrying nuts in their pouched mouths, and stopping in front of me to chatter and jerk their tails. Dr. Gross, of New York, reports a small terrier that was trained to sing several tunes, among them "The Last Rose of Summer," the doctor accompanying on the violin. Strange as it may seem, the dog appreciated musical sentiment. A friend of mine owns, in Utica, a remarkably fine creature, that with exquisite grace and affection, and complete understanding of his master's commands, adds a power to dance to music. The execution is in good time, and with reasonable grace.

I am equally sure that the germs of moral character are found very low down among animals; and that higher up there is displayed a keen perception of right, and a strongly developed moral will. In the very earliest development, when two cells co-operate in one structure, you see a beginning of that higher co-operation that subjects a whole body of millions of cells, organized for many functions, to a will for the general good. For what do you mean by the morals of temperance, but that the stomach shall not gratify itself at the expense of the rest of the body; and what do you mean by sexual virtue, but that the reproductive desires shall be governed for the advantage of the brain and the general vitality? The higher animals are pre-eminently conscious of the propriety of such virtues; although some of them are examples of gross abuse of their functions. Or if you consider that to be morality which consists in living for the social good, it is magnificently manifested in the lower range of life. The ant gives its life for the young of the family, and for the good of the whole commonwealth. Birds go farther and make common cause; king-birds, robins, wrens, and others, joining in common defense against a hawk.

A horse that I once owned was stabled about seventy-five rods from the house. She was always accustomed to call me for what she wanted, and was persistent in efforts to express herself. On one occasion I heard from her a very loud and determined series of calls, that I interpreted as trouble. Leaving my work, I hurried to the barn, telling my hired man to follow. There I found her waiting, with great anxiety expressed in voice and appearance ; but her tones on my appearance at once changed to a whinny of immense satisfaction, followed by a sigh of relief. I found that my cows had succeeded in opening a door, letting loose some calves, and altogether were holding high carnival. The "Quarterly Journal" reported a story of a dog that, on one occasion, being exceedingly tempted, took a mutton-chop. His master saw him stealthily carry it under the sofa. There he remained for a quarter of an hour; but conscience was too much for him—he at last came to his master, and laid the chop at his feet with every sign of contrition. For hours after, when petted, he turned away his head, and refused to be at peace. Dr. Lindsay urges that a school for the education of apes would lead to startling results. The effect would probably be as marked in developing conceptions of moral relations as the purely intellectual. Evolution begun becomes a law, unless vital energy drops down into automatic instinct. The unconscious then controls the conscious, and further progress is impossible. This is doubtless true of many human races, as well as of individuals; and it is true of a large portion of animal life. But this leaves a measure of possible evolution in both animals and men. The hen, which is wholly selfish otherwise, becomes a model of unselfishness in the care of a young brood. But more, when she learns that you are not her enemy, she begins to trust you and seek you. Natural relations quicken intelligence and morals in human beings, probably beyond all other influences; and so it is with lower creatures. What self-denial, and tenderness, and providence, does a mother show for her boy, that fowls and cattle do not? Forbes writes from India : "One of a shooting-party, under a banyan-tree, killed a female monkey, and carried it to his tent, which was soon surrounded by forty or fifty of the tribe, who made a great noise, and seemed disposed to attack the aggressor. They retreated when he presented his fowling-piece, which they understood. The head of the troop, however, held his ground, chattering furiously. At length he came to the door of the tent and began a terrible moaning, and with most expressive gestures begged for the dead body. It was given to him, when he took it sadly in his arms, and bore it away to his waiting companions. The witnesses were so moved, they resolved never again to fire at a monkey."

A little, black, top-knot hen, of no special breed, had been borrowed to sit on some Brahma eggs. She did the work of a mother exceedingly well, nor ever seemed to think of her own home, which was about one eighth of a mile away. But when the chicks were a few weeks old, she came to the kitchen-door, and began a peculiar, sharply-intoned outcry. Back and forth she marched, occasionally stopping to pick a few kernels of food, and then on again with notes I had never heard from a hen before. It was a palpable effort to say something; and as no chicks were with her, it seemed probable she wished to say they had been caught. But that was not it, for after about five minutes of eloquent effort, she started across my lawns directly for her home. Her chicks were weaned; she had left them under the pie-plant leaves in the garden, then came to the door, notified us the job was done, and had gone home. It puzzled me beyond anything I have ever seen done by any dumb creature. There was a trustworthiness, combined with reason, that made the act not only intelligent but moral.

A kitten, six months older than another, as soon as she had learned to catch mice brought a share to the younger. The same cat, now fully grown, is in all things a model of generosity, refusing often to take her supper of milk till her two companions have arrived. This is a plain recognition of social interdependence, and the moral obligation of the stronger. "We that are strong ought to bear the infirmities of the weak." Do men fulfill the law any more honorably? The dog is frequently a policeman. Such instances have been authenticated from St. Louis and from New York—the dog taking his beat with regularity and fidelity. "Pompey," of St. Louis, was thoroughly familiar with the significance of different raps, and responded promptly and accurately. When lights were left burning he always rose on his hind legs, and made a careful investigation to see if all was right. Any prisoner that he assisted in arresting he always after recognized as an outlaw, and refused him the courtesy he showed to honest men. His service has been rendered always at night, and has continued for eight successive years.

M. Fischer says the monkeys have a full comprehension of the meaning of "mine" and "thine." Le Vaillant relates the story of his dog that, when traveling in Africa, he was missed from the train. An attendant was sent back along the route, and found him guarding a chair that had happened to fall from a wagon. The caravan was already two leagues away, and we can only say that the animal showed more moral sense than common sense. The dog's sense of property has become an instinct in many breeds, so that they are faithful at the expense of life.

My friends, that magnificent obedience to right that makes a man promptly choose what is good, and never flinch from duty, although it involve loss and pain, I can not ask you to admire too much. But, when you see the same fine self-devotion in all life's children, honor it, I pray, as a common factor of Nature—a universal faculty of life. It is character, whether you find it in man, or in bird, or ant, or dog. If in lower life it has ceased to demand choice, and is automatic, it is nevertheless as admirable as when, in a human life, after many years of right purpose, it becomes right instinct.

The development of a high social order is so well known as a characteristic of birds, insects, and wild animals, that I shall not need to spend time on the point, although it is above all fascinating. Not only do sparrows live in communes, but there is a decided social interchange between many of our common birds. I have just come in from my lawn, where I stooped to pick up a young robin. At his cry I was instantly beset by half a dozen kinds of birds, among which most notable were the orioles and grosbeaks. My cat-birds are too shrewd to misdoubt me and join in an assault. Wilson speaks of the friendship of the nut-hatch, brown creeper, spotted woodpecker, and chickadee. Two lady quails will sit side by side on one nest. Orioles and robins are special friends. But the peculiar social instincts of even weaver-birds and swallows are insignificant to what we find in the ant's hillock. Here is a system of government more complete and elaborate than that of the highest civilization among men. But here, as everywhere else in the insect kingdom, conscious progress has so absolutely dropped into automatism that the ant and bee can hardly be classed as on the road of progress.

Human instinct is the resultant of antecedent reason, and we believe this is true of creatures below man. Can it be true of the tiny bee and the ant? Our knowledge of the infinite powers below us is as scanty as of the infinite powers above us. It is impossible for us to decide that, in the realm of the microscopic, sensation is not as productive of intelligent action as in the bulkier realm that we reach with the telescope. Indeed, we find it quite as difficult to conceive of nice shades of intelligence in the mammoth as we do in the scale-bug. Yet we find that the elephant is one of the creatures that is most capable of instruction, while the whale in the sea is not stupid in proportion to his bulk. The sphinx that plasters into a cell with her eggs a bunch of spiders, carefully stung to paralyze them, seems to be doing what she can not have reasoned out, and yet can not do without a process analogous to reason; especially when we find that she invariably provisions a cell that is to hold the egg of a male less bountifully than that which is to hold a female. She never fails, either, to put just so many spiders to a cell. Does she count? Are we so sure that it is not our reason which fails to comprehend the possibilities in so small a brain? Here is a life devoted to one thought; nay, uncounted generations of wasps, all devoted to the one end of perpetuating in kind. Are we sure that the infinitesimal accumulations of experience may not have ended in this bit of sharp instinct? Whatever it is, it is now mostly automatic. The creature has become perfect in its way, and has little or no plasticity left.

On the other hand, the mammalian quadrupeds, including almost all the creatures we are most familiar with as domesticated, also the birds and fowls, retain a decided power of progress. They are all capable of improvement; and we must not forget that man's rise from the animal level dates from his domestication of other animals, and that to this day it is by his alliances of this sort that he is able to hold his own. The present tendency, however, is to turn from animals to the elements, and find in steam and electricity the aid formerly secured from the ox and horse and camel and dog. The animals with which we most deal are certainly capable of great progress. They can adapt themselves to changed environments, to a degree often remarkable. Few of them are what they were in their native habitat. The horse of our era is a very different creature intellectually from the narrow-brained, vicious mustang. The shepherd-dog and spaniel are more unlike the jackal and wolf in brain than in body. The cat on our hearths is hardly to be recognized in her wild relatives. All races in association with man either advance or degenerate. My cats, four in number, have learned the hour for milking; and, if I am detained beyond the regular hour in the field, one of them invariably seeks me out and reminds me of my duty. Every evening at six o'clock they hide under a hedge between the house and the barn, at intervals, and, when with my pail I pass by, each one in turn leaps out with a sportive greeting. Then with half-articulation they express their gratification. It is at this moment milking-time, and my cat "Gladstone" has come into my study to summon me. A friend has a cat that has learned, when he wishes to get into the house, to jump up and ring the door-bell. When in the cellar, he goes to the wires and pulls them. "Josh" is master of the premises, and an illustration of the power of animals to progress.

But if, in this evolutionary struggle, animal intelligence once passed over, as it did in man, into human self-consciousness and abstract reasoning, why is it not possible again; or, why is it not a continuous process? The chances for such combination of circumstances as shall make such evolution possible are as one to ten millions. The probabilities are always equilibrium, and arrest or cessation of progress. Secondly, man once on the scene became a power to repress all other development but his own. He made himself master of lower creatures for purely selfish ends. He has been autocrat over Nature. With the single exception of domesticated animals, all have been checked by his domineering brutality. Domestic animals have acquired, on the contrary, a vast amount of information, and a power to use it. With our brute period just behind us, we are now coming into a condition in which we can do something to help the animals. I am confident that we have about us a vast world that might become a thinking, companionable world, moving onward in the line and under the law of evolution by our assistance. We have assisted Nature to create the fleet racer out of a comparatively clumsy animal; the fat rotundity of bacon, out of the bristling angularity of the wild boar; the docile and intelligent Jersey, out of the savage or the dull races of bos; and this has for the most part been a recent achievement. But there is no reason why as much may not be accomplished with the intelligence of these creatures. Prof. Bartholomew's trained horses suggest—yes, demonstrate—that the horse, at least, is flexible to education. The drift of nature in the higher animals is manward. Of course, Nature never repeats herself, and not even in the anthropoid line will there ever be a second evolution of man; but this much is certain, the upward-looking of those below us is also an upward-lifting. A careful selection in the race of St. Bernard dogs would doubtless secure a development of brain-function approximating man. I have seen in a Quaker barnyard, ruled by sympathy, a spirit of duty and affection bred that was nothing less than morality. In the same way brutality and stupidity are rapidly imparted to creatures under our care.

Nor must it be forgotten that in some lines of sensation and psychical development some creatures have gone further than we have. Altruism in the ants is a more perfect element of character than in man, for the ant will die for the babes of the community, and unhesitatingly sacrifice itself for the general good. Other creatures have power of discrimination that outreaches the human. And by human, I mean man at his best. General Crook, in his description of the Apaches, says they do not have the power to comprehend what we designate morals. Revenge and retaliation are prime moral duties with them. Our Ten Commandments express the morals of a very advanced state of society. They were an astounding innovation to the men of three thousand years ago. The masses of civilized men do not reach the code practically even yet. The murder of infants prevails largely through the world without reproach. Slavery of a brutal sort is held consistent with religion. The gods always went to war with their tribes. We send chaplains for our God when we send our armies to fight. The Old-Testament history hinges on the grant by Jehovah to the Israelites of the lands of unoffending Canaanites. Ants and men alike hold slaves, and have standing armies. Bees and men are alike loyal to government. The feline tribes and men are alike carnivorous and cruel. Dogs and men are alike possessed of honor and of revenge. The larynx is the real barrier, but even that is largely overcome in some birds and quadrupeds. And for the greater part of his career, man himself was without articulation and articulate speech. Early language was evidently imitative of natural sounds. And that same mimicry which is so general a quality of living creatures in the effort for protection and existence, is apparently at the basis of the development of speech. In the mocking-birds, the thrushes, it is a passion that passes over into a possibility of articulation. The same is true of the parrot and the monkey. It is, in reality, at the bottom of nearly all, or all of progress. The effort to do what is seen to be done, and thereupon doing it, to do it better, is the continuation of the struggle for existence which involved a ruder imitation.

Consider once more what vast development the animal world achieved before the initial efforts of man began ; before, in fact, reaching an anthropoid of any sort. Draw a straight line to indicate the evolution of intelligence ; then across that draw a line at the point where nerves are first set up structurally ; draw another across where sensation is first organized in a localized eye ; then another where an ant fights a pitched battle for the children of the tribe ; then one more where man begins to chip flint hatchets, and you will see that more progress was made, more wonderful evolution occurred, in the earliest stages of life-history—more in reaching the dog or ape than from that stage in reaching man.

The line between man and beast is often asserted to be that of abstract reasoning. It is evident, from illustrations already given, that this is not accurate. Just how far and how abstractly a dog can carry a train of logic is hard to determine, but there is in him more than a germ of such power, while in savages there is frequently less than in the dog. The idea of God in a thoroughly wild race of men is of a being as groveling as themselves. Nor does the average European have any idea of a deity beyond that of a magnified man. The only God of a child is the parent. The God of an animal is his master.

Not only in reasoning, but in their sensations, low races of men approximate the higher animals more closely than they do the more civilized races of men. They not only have larger organs for smelling, but they use them as animals do. The savage smells of roots and fruits to determine their poisonous qualities, or fitness for food. Idiots, who are cases of arrested development, act in a similar manner. Their judgment goes no higher than to estimate tastes that come through this simpler sense. Civilization, on the contrary, calls into special activity the eye, which lies nearer the brain, and is the only sense that in its range of power outreaches the earth. Mr. Clarke, of Illinois, illustrates this point by the following story: "While we were talking, two young dogs had gone to an eminence, a few rods from the old man's cabin, and, with their noses in the air, at short intervals uttered low, warning cries. The trapper soon noticed it, and, calling to an old dog in the cabin, said, 'Dave, go up yonder, and see what those youngsters are making a fuss about.' The dog, after reaching the place, and standing a moment with outstretched neck and distended nostrils, gave a clear but low warning notice, such as I had never heard from a dog before. 'Is that so, Dave?' said the old man. He immediately went to the same place, and began to sniff the air, after the manner of the dogs. 'Sure enough, Dave,' he said, 'you are right.' 'What is it?' I asked. 'The prairie is on fire some thirty or forty miles northwest of here. I must set a back-fire, or my cabin and bees will be ashes before morning; and do you warn the people at the settlement.' I tried my sense of smell, imitating the trapper and dogs, but could detect only sweet October air. But they were right."

I have already, in another connection, told you of the Australian trail-hunter, who scents the track of robbers on all fours, precisely as a dog. This power is lost in civilized races, but it is only displaced by a power of scent equally marvelous. It is estimated that the sense of smell is two hundred times more delicate than the test of the spectroscope. The nose detects the one four hundred and sixty-millionth of a milligramme of certain odors, and is no doubt for the higher uses of refined life not a waning sense.

So it is that, when we go forward from primordial life, we find one road of intelligence widening upward to man. All creatures and all plants are somewhere on this road. Some are wholly arrested in development at one point on the road or another; others at points are cases of completion, and exist as automatons; others are so largely instinctive that they retain little power of progress; but the higher animals, retaining plastic powers, are but little behind man. The really separating line seems to be that man in some stage of his career becomes self-conscious, and from the basis of self-consciousness reaches such abstract conceptions as the finite and eternal. All life begins with sensation, and rises by degrees to consciousness, and there are living creatures at every milestone of sensation and consciousness, up to rational self-consciousness. How admirably is this illustrated by the fact I gave you from anatomy, that Nature, in giving birth to a Tennyson, starts him at the beginning of this road, and leads him through its whole tortuous windings, compelling him to touch each milestone of progress ever made in all the past, before it brings him forth to sing his "In Memoriam." We never quite forget the road. Our habits and instincts are backward-looking, as the actions and purposings of animals are forward-looking. Our systems are charged in every fiber with the eternity behind us. What was done a million years ago is vital in us to-day; all of the early sensation of that great kingdom when plant and animal life was one; all of the later animal, its loves, its hates, its ferocities, its amenities, and tendencies, are our property. We not only in prenatal life rehearse the past structurally and intellectually, but we remember the rehearsal in our impulses and tendencies. What reason have we for supposing, somewhere outside of and apart from Nature, a force needed to interfere in a consecution so complete; and by creative will to annul the process?

PART THIRD.

LECTURE I.

CO-OPERATION IN EVOLUTION.

I KNOW nothing in the history of evolution so pleasant to dwell upon as the social element. For in reality, from the very outset, there has not been a mere selfish individual struggle to exist, but there has been co-operation and helpfulness in every stage of the ferment, between all creatures and all forms of life, and even between the unconscious forces. The chemic world is full of friendships as well as repulsions, and the basis of human society is laid as far down as the primal cells of jelly existence. When the first cell divided to multiply, it was to multiply itself. They twain were still one, and they had common interests in the elemental seas. The one became two, but the two were one. They had common needs, common propulsion, common destiny. The zoöid buds, and sends out its life propulsion in all directions, until it is a colony, with united interests and a single life-basis. In the vegetable kingdom this tendency was carried up into the beautiful idea of a single tree, with a thousand branches and a million buds. In truth, each bud is a separate life. You can cut it off and graft it into another tree; that is, transfer it to another life-colony; or you may sever it, and by judicious planting begin a new colony. But never, in the plant or the animal world, was or is the idea of the common weal lost sight of. It will, of necessity, go on with evolution, as an integral part of the process, and, in higher organic and functional life, it must blossom and fruit in the superb fellowship of the human family.

But when you say twain in one you not only establish the idea of unity but of duality. The two must forever endeavor to express itself, as well as the one. It always will be present in all things, in all phases of existence; and those who let their minds dwell on the dual idea will build up those religions that, losing sight of unity, teach us the universe as ruled by two distinct and opposing ideas or forces—the good and the bad; while those who, forgetting the twain, see only the one, will teach a theology in which God is an autocrat One, creating all things by his will, and destroying as freely as he creates. Only by keeping in mind the essential idea of life as one of two do we find the unity in which there is eternal intro-action, co-operation, evolution, mutual responsibility, and at last the God finding himself in the babe or the beggar, and the wretched and poor finding themselves in God. "I in them and thou in me, that they may be made perfect in one."

Or, to go still lower, or rather further, what shall we make of what we call, in higher life, mind and matter; that puzzle that no science can solve, but which just as truly exists where there is no life but the jelly-fish, or no life at all? The unity and completeness of the universe, in its elemental condition, involves purpose as well as force, mind as well as matter, not as two separate units, but as two in one, ever apparently separable, but really never separable, for once more the twain are one. Mind and matter are the infinite and essential co-operative necessity of Nature, an idea that is never lost, for, whichever way you move, you find your God to be—he must be—the All in All, the One in Many, the multifold of One. Or, if you prefer to consider the universe apart from the possible bias of theological terms, we still find the Cosmos a mental process in material form.

Again, we come upon motion and sensation, a correspondence between the external and the internal; a motion without, it is a sensation within. No one has yet traced the bridge, the passage-way between the two. We find the transition going on in ourselves. It is everywhere where life is. What is it? How is it? It is thus that we learn of the outside universe; without it no life is conceivable. A ray of light from a star touches the eye, there is a sensation carried into the brain, a perception follows, a thought; the world without is to be made a world within. Here is a co-operation established most marvelous—motion without, sensation within. The twain, also, are in reality one; it is the unity that can arise only when chemically the organic life within responds accurately to the force that beats on it from without. The inner life, meeting the outer dynamic forces, co-operates to create consciousness.

Consciousness, as I use the term, is a higher condition of the sensation and apperception of the lowest forms of life. And, if you will consider consciousness, you find once more this incompleteness of the isolated powers. Consciousness is possible as an aggressive and progressive tendency only as it works over into and establishes a storage of unconsciousness. So is unconsciousness a terrible sepulchre, except as it is attended by and waits on the conscious. You and I, like every living creature, are made up of organs that work, in large degree, mechanically. Only at the aggressive edge of purpose, where effort seizes upon the new, are we conscious. What we have well learned how to do, we thereafter do largely or wholly unconsciously. But if this were not so there could be no progress. Until unconsciousness is largely established, and there is a vast heredity that seizes upon, nay, rather constitutes, the embryo, it would be at the mercy of the mother's every whim. Now, whatever aberrant thoughts and desires possess a mother's mind, she can not wholly overcome the great unconscious tide that carries the embryo in her womb over a fixed route to certain assured development. If, then, the mammals had come earlier into existence, and man had been evolved before this long, long, slow, but steady accumulation of heredity, we could not exist as families, as races, as friends —indeed, not one organ would be sure, not one function guaranteed. The result would be extravagant aberrance, degeneration, and obliteration.

But, instead of this, consciousness and unconsciousness wait on each other, neither capable of working alone, but both together constituting the unit of progressive life. The twain are the one. This is true of the finite creature; is it not true also of the Infinite and Universal, that it can not be conceived as conscious only, but as a unity of infinite unconscious energy operating also consciously? Consciousness, as the margin of the unconscious, along which purpose pushes its determination — where effort reaches after the new—may arise anywhere in the universe where the bioplasmic elements coincide, or, possibly, other elements equally capable of vital manifestation. All selection that is determinative choice, is intelligent selection; but it must invariably pass into unconscious storage; and all storage of unconsciousness, in connection with consciousness, remains as memory. So, if our past is stored and our present is aggressive, our future is assured.

It is impossible that the organic life of the globe should have accrued without both consciousness and memory. Given these, and evolution has no conceivable limit. I dwell on this point, somewhat abstruse as it may appear at a glance, because it touches the greatest of all puzzles—that of the apparent lapse of all conscious energy into the unconscious; trying to solve which has led to such barren systems of philosophy. Nature understood that in order to place man in the field a vast amount of work must be taken off his hands, and so he be allowed to concentrate his attention on things before, and not behind—on invention, on progress. He must breathe, and digest, and a hundred more things, but not put volition to it. So it had long been an arrangement of Nature that as soon as a problem of structure or function was worked out, to let it alone, to pay no more attention to it. For instance, it took ages to establish a heart and circulatory system. Lower creatures had this to aim at and to do, and then it was done for them, and all those after them, with only modification to circumstances. Our hearts take care of themselves. So from the outset of life a nutritive system was under advisement and amendment. If a jelly-fish ate, he must extemporize a stomach, and use it each time with expense of will. Slowly a good alimentary arrangement was constructed, and no further effort was needed in that direction. We have only to consciously masticate our food, and then pass it on to unconscious digestion and assimilation. So were the limbs and sense-organs mainly worked-out problems. Take it all in all, ninety-nine hundredths of all a man does he does automatically. That leaves his brain time and strength to attend to other affairs. Conscious labor of an intellectual and moral sort is also, as I have in a previous lecture shown, passing over to automatic precision. It gets very easy to live a virtue that at first caused us a terrible struggle, and then we live it instinctively. Nature never could have secured a great thinker of cosmic problems, and problems of the psyche, if every day he must not only eat, but must digest, and must run his own heart and lungs, and do a vast deal more of such mechanical work. Shakespeare, if he or his fathers have not spoiled his stomach, has only to put in his food and then go on with his immortal dramas. Unfortunately, most of us have so damaged the automatic unconsciously working part of our bodies that we must be largely occupied with tinkering and repairing. If I sit down to write, I ought to be able, after years of practice, to secure right words, and right collocations of words, and do my pen-work absolutely automatically; and if, owing to loss of sleep or due recreation, or over-feeding, or under-feeding, my words and my pen demand conscious attention, then my thinking is blurred and dull. So intimately co-operative are the conscious and unconscious organic operations of a human being. No disaster can occur greater than that an unconscious function shall be rendered consciously active. The stomach in health acts automatically; in disease, it is irritably a felt factor of our living.

With this twain in one so fundamentally, vitally, interfused in the universe, and so manifest in the dawn of life, it was certain that sooner or later the differencing of one must become more perfect into two; and the two must constitute a more perfect one, as indeed occurred when the idea of sex was established. In primal life sex is perfect in each individual; the male is unknown. So long as this continues Nature could not manifest the higher forms of intercommunion and co-operation. Finally, from the unified individual, sexually complete, male and female in one, arose the twofold form of the individual. This was one stage farther toward the twain in one. Now arose the relation of marriage, the sexual union, under the attraction of desire, and with a unified purpose of two individuals. Herein lay the magnificent conception of love, the human family, the fellowship of a Joseph and a Mary that gives birth to a Jesus or a Plato, a Spinoza or a Darwin, as a gift to the world. Mark how the twain in one idea develops as soon as sex is firmly established. How meager was its fruitage before; how glorious afterward. There is to-day in human language no word of love and loveliness that was not born of this sexual division of the primal unity. Marriage is a mere symbol of that innate predestinated singleness which is involved in the idea of sex. Its limitations and regulations fall under the moral and social laws of the latest human experience; but in itself it is the instinct of life. The lover seeks in his beloved himself, that he may be completed. Reproduction is not the first thought of a true marriage, but self-completion. They twain are the one. When Virgil sailed from Rome, Horace sang: "O ship, thou bearest away from me one half of myself!" Friendship is thus closely typical of sexual love.

It was a comparatively recent device of evolution to exchange the plan of reproduction by laying eggs externally, to be perfected by heat, for the plan of retaining the egg in the mother until the embryo came to conscious functioning. At this point came in that further evolution of co-operation which we see in the lengthening infancy of mammals. This became the tendency of all mammalian life. The birds in the trees built nests, and established a transient home-life. The quadrupeds, like buffaloes, elephants, horses, must take care of their young for many months. As life ascended psychically, infancy lengthened, till with apes it became a matter no longer of months but of years. The consequence was the sentiment of devotion, based on mutual obligation and common interest, was increased into a controlling life-factor. The transient affection of a fowl for its chick became a life tenderness. The change was indeed slow, but it was assured by the opening of the mammalian era. The calf feeds itself at birth, and its dam loses sense of kinship by the close of a single year; but the young monkey is a helpless creature, that must be fed by its parents for months, and carefully guarded for years. This tendency to enlarge the demands upon the parents steadily increased the co-operative action of individuals, and brought about the possibility of a permanent family. It clearly also held the thought of monogamy as the basis of the higher sexual union. The same idea was wrought out in a fragmentary way, in other lines of life, apart from mammals. The brain began also to be of increased importance, and wit, relatively to strength, assumed a higher place in devising means to protect and support the family. Whatever evolution accomplished in consequence of the struggle for individual existence, you see it must accomplish a great deal more when the struggle was for two, or three, or more existences. Then also followed of necessity a vast increase of conscious moral choice. The parents burdened for life with the care of children, much as they devised for themselves, must devise more carefully for their babes; hence followed that altruism, which, noble in the beasts, is Godlike in man; as well as manlike in God.

Then you see as a consequence there must be established more of a permanent home. A few of the fishes build nests; birds keep more or less guard of their eggs, but spawn is for the most part left to chances, and of eggs probably four fifths of all that are laid are destroyed without protection or defense, or seriously disturbing the happiness of their owners. But at the beginning of the mammalian age the mother wrapped her babe to her breast, and then, no doubt by the mere force of continuous effort, developed folds in her skin that became permanent, and inherited pouches, in which the young could be carried. In the same way, by continuous effort, the power originated to feed the young from the life of the mother herself; the breast flowed milk, and the union of parent and child was complete. The opossum took her young on her back, where it sat with its tail firmly twisted about its mother's, while she sought food for both. All mammals will give their lives cheerfully for their babes. Many of them sought caves, where the family made permanent homes, and had a definite range for food. The house of the bird is not an abode; the house of the mammal is more or less permanently a residence. So Nature felt her way toward the home-life, in which orderly co-operation fulfills the functions of a highly complex life.

Out of the thought of home has grown every element of social progress. The family is the unit of human existence. The lower creatures exist as individuals with no specific ties; but the higher exist only as socially united. The first appearance of human-kind is as a family. Society with us is not and never was a mere duplication and reduplication of persons; but is, and always was, a multiple of families. A herd of buffaloes is more truly a herd of individuals; a flock of birds is a flock of friends; but always and everywhere man exists as so many families. The tribe is an enlarged family. The nation is an organization of families. From the first, the anthropoid has been a home-builder, and his progress is sketched by his increasing skill in glorifying home. All civilization is the unfolding of the words father, mother, and child.

Soon after the differentiation of sex, or coincident with it, was the differencing of the vegetable form of life from the animal. Here was a parting of the living process into two diverging channels, never to be reunited. Apparently this was an alienation that could have no form of fellowship. The animal kingdom moved off aggressive, progressive, effortful, and conscious. The vegetable kingdom was for a while of the same sort, effortful, progressive, conscious; but finally finished its achievements, lost its consciousness, and for progress became wholly dependent on the animal world. But the vegetable and animal kingdoms are a grand illustration of the same thought before dealt with, the co-operation of every department of Nature in securing the fulfillment of progressive life-functions and higher organic forms. The vegetable and the animal kingdoms each perform separate functions of a single life. Life can not chemically exist under either purely animal conditions, or under purely vegetable; that is, a vegetable world is impossible, as also a purely animal world. The work of plants is deoxidation; the work of animals is to oxidize. Plants bring the forces of Nature into chemical compounds; animals set them free. Both functions resided in the single primitive cell, but the offices were divided on the road, for now the animal kingdom can not make protoplasm, but borrows it. The plant kingdom makes it *de novo*. They co-operate, in that one uses up that which the other wastes or rejects. The rose-blossom in your window is woven of the carbon that your lungs have ejected from the animal functions of your body.

In some degree we recognize the vegetable as inferior to the animal. It is such only as having become more complete in function, and, therefore, its energy has passed into or dropped to the automatic and unconscious. The animal devours the vegetable, apparently as the superior, yet the air is filled with vegetable spores waiting a chance to settle upon and devour the animal. Terribly triumphant is the vegetable, when, as typhoid, or as scarlet fever, or as black-death, it sits upon the pestilence, and depopulates, as it terrifies, cities and states.

But here we are far from gathering the full meaning of co-operation between the two kingdoms of life. The vegetable and the animal have ever acted as a counterpoise in the struggle for existence. Vegetable functions at any time largely predominating, would put an end to all high forms of existence. The same is true of animal functioning. Eras have always alternated, in the life-history of the globe, between superabundant animal fecundity, and superabundant plant fecundity. The carboniferous vegetable era followed the silurian animal era. The saurian supremacy of animal life followed the carboniferous. This is Nature's self-corrective method. With man came in a nicer balance, as I have shown you; but still the preponderance was animal. Early man's enemies were almost wholly animals, as ours of to-day are almost wholly vegetables. Nearly all sorts of animal life—insects excepted—are rapidly on the decrease. Insects alone man is unable to cope with; but Nature comes to our assistance. Insect-eating and insect-poisoning plants are a vigorous stock, and are on the increase. The probability is that we shall pass slowly into an age wherein animal life will be at its minimum. Will then the flesh-eating plants be our allies, on the whole, or will they be our foes? At present, not over one plant in five hundred aids man directly; the rest are of use to us only in the way of antagonism, calling out our energies, and sharpening our wits. A keen student of Nature, however, can not but be startled, if not alarmed, when he discovers the rapid spread over the tilled earth of the vilest and most degenerate of all plants. These are an invading army, an aggressive, parasitic, cosmopolitan set of nettles, thistles, and banes of all sorts. Over one half the working-time of the farmer is occupied in fighting these vicious and ineradicable terrors, while the insect tribes with increasing avidity threaten to occupy all the rest of his time. We must not, however, overlook the compensative adjustment whereby man, in his struggle with the insect tribes, while helpless alone, has, in the birds, an alliance fully capable of coping with the evil. It is a crime to kill our friends that hover over us to protect our crops. Without them we shall be ingloriously beaten and degenerate. So intimate is the co-operative interchange between creatures apparently so little related as birds and men. Yet we find our special sport in the wholesale slaughter of our winged friends. Our occupancy of the soil and our civilization grow precarious, in order that our women may wear our songsters' feathers, and our brainless men may have "sport."

Our relation to the two kingdoms is such that we have subjected to direct use about fifty species of animals and five hundred species of plants. This is about the relative strength of the two kingdoms. Where man has first succeeded in domesticating individuals of both kingdoms, he has himself earliest begun to be civilized. His power has been proportionate to his subjects. In Western Asia was the original home of most of our domestic animals and fruits. Europe and Asia, with the horse, reindeer, ox, dog, cow; and wheat, barley, apples, pears, and grapes, nursed man into a higher conception of life. Australia gave its human inhabitants not one subservient animal, and little in the way of useful vegetation; as a consequence, the Australian man remained a savage. There was not even a wild beast to test his strength and awaken cunning.

Man is adapted only to a temperate climate; to the later autumn of the world's history. For ages after his appearance he could have existed only at or near the poles. If you divide geological time into ten equal periods, nine must have passed away before you get to the mammals. Supposing the continuance of life to have been two hundred and fifty millions of years, then two hundred and twenty-five millions were used up on egg-layers and their predecessors. At least half of the remaining twenty-five millions lapsed before true birds, and several millions more were used in the development of quadrupeds before the primates. At last man or a man-like creature was evolved in a sort of geologic yesterday. It is safe to presume that we shall yet find the remains of such a creature far more remote than any yet discovered; but we shall then not be carried back one half of one million of years; anterior to which stretch away possibly two hundred and fifty millions of years without the voice of a human being.

Looked at in its relation to man, all this boundless waste of time was preparatory to his appearance. He could not have existed sooner as man; although as an anthropoid animal he might have held a restricted existence. Our distant cousins the lemurs and apes were once distributed over almost all parts of the globe, but increasing cold drove them steadily down into tropical lands; and there they are to-day, chattering and degenerate failures.

While monkeys were proving their inability to overcome the hindrances to progress, other lines of evolution of great importance were worked out. The horse, the dog, the camel, the cat, and above all the bovine race, and the swine, were developed on land; while in the sea progress was made in the way of seals, whales, and true fishes. Among all these the larger brains and the incipient hands of the lemurs and monkeys would seem to have secured for them pre-eminence. But no monkey ever kindled a fire, or made an axe, or wove himself a suit of clothes. The ox, and cow, and horse, were to become co-operators, not with the arboreal creatures, but with another who, with larger brain, should learn to tread the earth, and subdue it.

What Nature had to accomplish by a preliminary co-operation of activities may be thus summed up. She must secure firstly a biped, or a possibility of a biped, in whom the fore-feet should be transformed functionally into hands. Secondly, a creature making the most of the brain, rather than of the teeth, or hoofs, or horns. Thirdly, a mammal, and therewith a lengthening of infancy, and home life, with the elemental demands of society and ethics. Fourthly, a tendency to pliable laryngeal cords, making possible language, on which hinges all human civilization.

The mammal was well established, and a lengthened infancy. The lemur and monkey attained the well-formed hand, with that peculiarly sensitive finger-tip, in which lies the perfection of touch, and much of the artistic as well as industrial power of human beings. The largely increased cerebrum, with a tendency of the frontal brain to rise over and direct the sensorium, was also established. Already the tail in the higher monkeys had been aborted, and an erect posture nearly attained. The hands were free; the head dominant. The direct ancestors of man, a line not yet discovered, had done better in some respects, and probably approached nearer to articulation than any cognate branches of the apes. But the one point left almost wholly for man himself to work out was the problem of speech. This he must do with no co-operation except that which lay in the unfolding duality of mind and matter.

The unconscious storage of energy was already enormous. Heredity was a magnificent fact no longer liable to be overcome by environments. Consciousness rose to self-consciousness. The structure best adapted to reflection was secured. In earlier life-forms the eyes were distributed anywhere, obeying only the need of being at the tentacular, pushing, oral extremes of the protoplasm. They were organs of observation. So also the nose was an open, alert organ, intended to gather a range of facts with speed concerning food and danger. But already, before man, the eyes were fixed in the forehead, looking not everywhere, but ahead; and the nose was shaping itself to an intellectual use. The world was preparing for the thinker. Man must not only think, but know that he thinks—not only be conscious, but conscious of himself.

Nature did more than this in the way of preparation before man could appear. She developed a sense of the beautiful. This, which in man is to render his fine arts possible, and become the soul of his finer evolution, inspiriting his moral life, as well as ennobling his physical—chiseling his features and frame as well as his statues, and building his cathedrals—was in lower life a function largely growing out of sexual duality. The desire and effort to please each other pressed in the direction of beautiful colors. But in my lecture on mimicry this is fully discussed. Curiously it had come about that in all lower life the beautiful was considered before the useful; and when you come to savage men it is the same way. Poetry preceded prose, and singing is peculiarly the gift of the negro. The lower races adorn themselves before they clothe themselves. Gold came into use thousands of years before the useful metals. This love of beauty was wonderfully developed in the birds and quadrupeds just before the era of man. The flowers also flamed out about that time to attract insects; and so the world into which man was born was eminently unlike all its preceding stages, it was pre-eminently the world of beauty. Naturally the first thing we know of man's doing well was scratching pictures on horns, or rough tools. The earliest literature was songs and tales; that is, while he made slow progress in the art of reasoning, he was given to the use of the imagination. He worked out complicate and brilliant theologies, before he had a science. He had priests before he had carpenters. But there lay the germ of poetry and of hope; and all that power to glorify common things that is the art of sweet-singing souls. A race of pure logicians would find the world unendurable. When poetry dies suicide will be the law.

We have seen how, out of the differencing of the sexual powers, arose the family. The unassociated family would, however, be normally a savage element, living with its hand against its neighbor, and in return receiving blow for blow. The higher social co-operations that constitute civilization were not wholly original with man. It was a necessity of evolution that association and co-operation should grow complex and inextricable. The very telephone that whispers my wants a thousand miles is but an enlargement of Nature's essential idea of unity in diversity. The birds had formed a few social groups; and the ants, on a line wholly diverged from ours, had established tribes and kingdoms; as well as making war, holding slaves, and doing other things that account for their finished development. In all directions we see that social ideas were becoming an organic part of evolution. Obedience, work for common weal, recognition of mutual obligation were not of man's invention. In addition to the family based on affection, the world had a great deal of law in operation, based on community of needs and desires. This was gathered up into man, with other preconceived elements of progress, and enabled him to become pre-eminently the social organizer with laws that gird the globe.

Even our established industries are not an exception to the general fact that man, and all of man, was involved in the very idea of evolution. The ant keeps its herd of cows quite as carefully as you stable your Holsteins. There is one species that not only carefully protects and fights for this kind of property, but actually carries off droves of aphides to domesticate and feed in order to enjoy their honeyed secretions or milk. What a noble industry is the manufacture and storage of honey! All such industries, involving a surplus of food, implied a growing power of prevision in living creatures. The cow will trample and tear a meadow into nine tenths waste, and starve in the winter. The dog, however, will bury a bone. This is the dawn of the idea of time in the animal brain; the cow has none of it; the dog has the germ of it. One of autumn's pleasantest recreations is to visit a forest and chat with the squirrels as they gather nuts for winter. This industrial and social foresight man inherited. He had no more to begin with; the lower races have no more to-day. The poorer classes are improvident to a terrible degree. They eat what they can get, and dream of heaven, where they will be fed without forethought or care.

Society and social industrial co-operation had even developed to the idea of internationalism. My lawns and orchards, with their long lines of hedges, are a favorite resort of orioles, robins, cat-birds, and their intimates. But whenever the English sparrow undertakes to secure a footing the other birds make common cause to bar him out. The pugnacious rogue is not wanted. It is not uncommon to see a hawk chased by a half-dozen species of birds, generally led by a kingbird. This power to rise above the tribal idea leads so many creatures to ally themselves with us as domestics. It is internationalism, with international laws to be enforced. It is the recognition of the unity of right, and honesty, and virtue, as against the unity of vice and rascality. Man only makes wider application of the same conception.

So you see constantly the grand idea of co-operation rising and widening its influence; while at the same time a secondary co-operation is carried on with the man yet to come—that is, Nature has her eyes in her forehead. But on no other thing do wit and brain so wait as on a power of cosmopolitan locomotion. Consider how vast the progress made in this respect from the oyster to the saurian. But how much greater the advance from the huge saurians to the birds in the air, the fishes in the sea, and the quadrupeds on land. You may gauge alertness of mind almost exactly by the largeness of the life lived. Creatures confined to a few sensations and few experiences are dull, and liable to degenerate; those that see much, hear much, feel much, also remember much and try much; and that constitutes evolution. Only as man took up animal cosmopolitanism, and by inventing more rapid transit, by domesticating fleet animals, by using wind-power and steam-power, accumulated a vast store of information, did he become the lord and logician that he is. All our sciences consist of the comparison of data secured by wide investigation. Civilization has always been gauged by commerce. Geological changes, coalescing islands into vast continents during our era, have enabled us to migrate with greater ease; to secure food more readily; and to enlarge our field of observation. Civilization is more truly migratory than barbarism, but it carries arts instead of war, and plants homes instead of huts or tents. Man, in his primitive state, lived precisely like the beast, and all the world would barely sustain a million. It was simply a struggle to eat, or be eaten, while he herded in the same caves with bears, elephants, and other races of animals. His brain was proportionally largest, and gave him a slight advantage. Still, a big brain has big demands. Infancy is longer as the brain increases in relative size; so there were good chances that evolution would be circumvented, and the anthropoid be killed off. Some branches of the family were constantly becoming victims of arrested development; but the brain has triumphed, and all difficulties have been one by one overcome. The end, so far, is Gladstone, Cavour, Lincoln.

It is evident from the earlier history of anthropoid life that no such being as man could have secured footing at an earlier age. He could not have withstood the reptilian monsters, armor-plated and gigantic, with the least possibility of success. It has been quite enough for us to deal with the crocodile and the serpents, their degenerate and feebler descendants. I am convinced that the myth, connecting the serpent with the earliest troubles of the human race, arose from the fact that the saurian survival was man's most dangerous enemy during his primitive career, in a warmer era preceding the glacial. When the anthropoids began to multiply there were still vast numbers of saurian monsters, the chief of which were serpents. You can imagine the severity of the fight between the old conservatives on their bellies, and the radical on his feet. Naturally have floated down from those ages traditions of the struggle. All evil was associated with snakes, dragons, satans; the devil who took the shape of a serpent.

But, as I have said, the insect tribes and vegetable pests remain. These are not out of the role of co-operation, because antagonism is vitally essential to call out the keenest display of intelligence. It is a bit of the conceit of the creation theory, that the world was constructed out of hand for man's supremacy. Evolution answers it was made for the smartest. If the bugs beat us, there is no Divine Providence that will step in to shield us. To the victor belong the spoils. We have made good headway with everything else, but the insects have never yet sent in the white flag. All the mammals are our slaves; or are outlaws to be killed at sight.

With man on the scene, co-operation took higher forms. Animal life had parted in the early tertiary into herb-eaters and flesh-eaters. We could not dispense with the aid of either. From the herbivora we have our right-hand helpers, the camels, asses, and horses, as well as sheep and kine. What civilization would be if these were stricken out you can judge, The earliest break from barbarism was in conjunction with the taming of the dog and cow, reindeer and camel. They furnished man food and transit, or protected his person. This interlinking of the fate of races has never failed to intensify. Not only does no man live for himself, but no creature lives for itself. These friends of man and man himself improve together, or degenerate separately. Curiously enough, the closest friends in this alliance of animal evolution are in reality but diverged lines of one family. You remember that Professor Cope's prophecy pointed back to a "five-toed, plantigrade, bunodont common ancestor of all the prominent tertiary mammals." The *Phenacodus primævus* was, in reality, found soon after; the type of the ancestors of the odd-toed and cloven-hoofed animals, the fierce carnivora, the lemurs, and monkeys, as well as man. So it happens that, in enlisting the horse, dog, and cow in our service, we are only securing the co-operation of remote relatives. So wonderful are the relationships of life, so marvelous the revelations of biology.

But this is not the end of the story. Consider what it is to-day on which our brain-life most feeds and develops. You answer without doubt the trees, the landscapes, the birds, and the flowers. These are our inspiration. But until about the appearance of man the globe was covered with flowerless vegetation; the trees were wholly of the evergreen sort; and the landscapes, notwithstanding Nature's fecundity, were lacking in every feature that now our minds dwell on with pleasure. Nor were there singing-birds in those days, and none at all but of a reptilian sort, with teeth; creatures less agreeable than an ostrich. There were no such landscapes as beget poems. They were dull, heavy, dark, forbidding. Not an elm, oak, maple, or even poplar or willow, softened or enlivened the scene; nor did the grasses we love clothe the fields. Not then could the bees make music and honey, for there were no flowers to furnish the nectar. But the world was growing cooler; and at the poles all trees were killed but those capable of adjusting themselves to a winter's leafless rest. The scene wonderfully changed. Deciduous trees, originated under the pressure of survival of the fittest, moved southward. The broad-leaved forests filled the lower zones, and flowers flamed on all the hillocks; while bees began to work and buzz, and birds to sing. Here were the poems at last; and they helped to make the poet. Two grand outbursts of life were now developed. The insect tribes evolved their wonderful social and industrial art, and, coming to a state of precision and completeness, settled down from consciousness into automatic instinct; while the arboreal ape became the terrestrial anthropoid, that ever since has moved forward toward higher stages of consciousness, and a larger storage of the unconscious.

In a previous lecture I said, but for four families of trees and plants mammals could not continue to exist, certainly not to make a factor in progressive evolution. These four are the rose family, the cereal family, the solanum family, and the palm family. These, with the human, might be called the five families that have a common destiny. Wherever we turn we find ourselves in interdependent relations with our four allies. The rose family stands foremost in the temperate zone. On our lawns it appears in hundreds of varieties of the best-loved of all flowers. In our orchards it gives us row after row of apples, pears, peaches, plums, cherries, apricots. In our gardens it occurs as the raspberry, the blackberry, the dewberry, and the strawberry. Obliterate these, and you would rob us of half the poetry and good-cheer of existence, as well as a large share of our subsistence. There is hardly a land in which some members of this family are not at home. The cereal family gives us our rye and wheat for bread; our rice, on which one third of the race mostly subsists; as well as oats and corn, for both ourselves and our domestic animals; and for the animals alone the true grasses. What could we do without them? From the solanum family come tobacco, a bane and curse to evolution; the tomato; and the most wonderful of all esculent roots, the potato. Finally, the palm, with its ancient representatives in the coal era, gives us not less than one thousand varieties of valuable fruits and fibers. It is usable for almost all purposes, and is to the tropics what the other three families are to the temperate zones. Noble aids in life, we, in turn, are able to ennoble them. In no way does the wit of man sharpen more readily, and labor find so pleasant reward, as in the scientific improvement of fruits and flowers. So far a high degree of civilization is possible only where the possession of plants that yield abundant food for a moderate outlay of labor, allows, with due toil and foresight, a large degree of leisure and relief from intent anxiety.

Even the vegetation and animal life of the remote past becomes a co-operator with human progress. The energy imprisoned in the carboniferous era is now set free to play another aggressive part in lighting our houses, and cooking our food, and driving our engines. What would be the fate of civilization deprived of oil and of coal? Not less valuable are the results in biological research of the animal deposits, the fossils and foot-prints of the past ages. Our knowledge of ourselves has mainly hinged on our discovery of these creatures, not ourselves, but in whom was the potency of all that followed in the way of life. To estimate the value intellectually and morally of evolution, as an hypothesis and demonstration, in widening our views of existence, in exalting our hopes, in liberating us from the dwarfing effect of a narrow theology, and still more in readjusting morals to the level of natural obligation;—this estimate belongs to the future, if, indeed, it can ever be fully apprehended.

Such is co-operation in evolution: a marvelous interlinking of destinies; an exchange of offices across lines of apparent demarkation, and even across the most remote ages. Here on my table lies a trilobite, picked up in the field by my boy. I know that it is part of the Trenton limestone, which is not far from me; but the distance of that limestone in time, although I can put it in approximate figures, my mind is incapable of measuring. Yet this trilobite now belongs in my lad's cabinet, and forms a part of his educational material. Stony old professor, your lesson is more valuable than that of the living fossil.

Turn we now to the individual man. I know of no demonstration more perfect or more important in the sphere of biology and of metaphysics than that by Edmund Montgomery, establishing the absolute unity of the organic individual. It is, however, a unity that, from the very outset, has an innate necessity to make of itself a social compact. All parts of the organic individual are mutually-interdependent. The head can not discharge the alimentary canal from further service. The foot not only serves the eye, but the eye watches over the foot. Not one nerve can suffer but all the body is in sympathy. And with the body suffers also that subtle, sentient ego which we call soul, and vainly try to dissever and dissect by itself. Psychology and physiology will hereafter be but two approaches to the study of an absolute unity—they twain are one; and one thing are, and were, in inmost reality. Idiocy, insanity, all morbid as well as all healthy intellectual and moral functioning, are a matter of body and soul in their undissevered oneness. The dyspeptic sees what his stomach sees. The sound mind is the sound body. The diseased body is the diseased mind. The cell at the outset was not a mere speck of protoplasm inspired from abroad; it was at once a vital, sentient speck endowed with inalienable selfhood; and when the great co-operative efforts of Nature are complete, man is sentient, vital substance. The duty of the cell was to fulfill its functional relation to the universe and to itself; that duty remains to man, illumined by consciousness.

The most important of moral needs is that the general interdependence of nature shall be supplemented in man by an appreciation of his responsibility in shaping this relation, by his own volition, for ethical ends. Societies for the suppression of cruelty to animals, all honest efforts to ameliorate the conditions of poverty, are thus man's contribution to the co-operative good-will of life energies. So also are all efforts to comprehend and enforce those methods of living, whereby evolution shall carry us and our neighbors ever farther from purely animal functioning up to ethical honor and obedience to rightness.

Last of all we come to note that co-operation which is so subtle and vital; the puzzle of consciousness, the defiance of reason—I mean the union and interchange of the seen and the unseen, the apparent and the non-apparent universe, or, as we may best continue to call them, the material and the spiritual. So fleeting and so ghostly is the spiritual that it is easy to deny its existence; so purely relative is the material that it is easily relegated by philosophy into subjectivity; yet the growing common sense of philosophy, as well as the affirmations of science, show us an unbroken, inextricable co-operation of the two in one—the seen and the unseen. Each lives in the other; is the other. Force passes into the unseen from the seen, and an equivalent is made by way of returning forces. The co-operative unity of diverging and converging lines of life and work, running through all divisions and subdivisions of the universe, sums up in a co-relation of thought and purpose, and the final co-operation of the conscious mind with the superconscious. The finality of existence is to secure a consciousness of the relation of the one and the One—a relation which is, and always was, as real as the unity in the life-cell—for we are all one in God; and there is One over all, through all, interpenetrating all. But all life has for its object to make this sublime oneness conceivable and consciously apparent. The ultimate word is love, in which end all threads of duty, desire, hope and tendency, as all the nerves lead to the brain. Morality means simply co-operation, recognition of mutual dependence. Is it any wonder that out of the intricacy of mutual helpfulness and antagonism, in every atom of nature, by which alone physical evolution was possible, arose the intricate interrelationship of individuals, whereby, through helpfulness and antagonism, ethical evolution is possible—and we obey and live, or disobey and die? From the mute attraction and repulsion in inorganic forces, whereby worlds are formed, up to the articulated hate and love whereby sons of God are created, there is but one deep, all-permeating operation.

Whither does this idea of co-operation at last lead us, but to the magnificent interdependence of the Infinite Will and our finite purposes; in the relation of father and child—making at last the ligature of the universe to be love, binding to the lowest the highest, and lifting the lowest by the power of sympathy to the bosom of the highest? So the universe is transformed from a struggle of forces to a fellowship of individuals; from a brute-force selfishness to a moral self-sacrificing co-operation; and in this final result, this divine end, we are one. He is the greatest of men who is the at-one-er—who, out of the multifold antagonism of evolution, aids most to produce the Holy Oneness of Eternal Love.

The crude view of the world as the work of an Omnipotent Creator, kept ever before our eyes the strange defects in the plan; the presence of death, yes, the evident prevision that made, as a part of the system, death-dealing plants and animals. What carnage! what ruthlessness! what death-dealing contrivances!—from the strongest to the least, ravening and selfishness. There was no solution but that the original plan had been disrupted—an evil power had interfused sin and ruin where benevolence alone had been devised. The world was under the wrath of God because of its alliance to this antagonist of the Creator; and henceforth whatever of good might come must come by supernatural interference.

But the study of evolution, at the first bringing foremost the idea of struggle, and the survival of the fittest, left our minds still dwelling on the ravin and destruction that permeate nature. What, after all, had we gained but a red-toothed Nature in place of a vindictive Creator—natural hate and selfishness in place of autocratic egoism—anarchy in the place of czarism ?

It has been my purpose in this lecture to show that, from the very outset, evolution has implied something besides a mere brute struggle for existence; that it involved a mutual helpfulness and co-operation for a common good, and that Nature stood pledged in the cell to create a moral intelligence, and in every cataclysm to establish as the ultimate law "On earth peace, good-will to men."

It has also been my purpose to bring out the duality of Nature, as in earlier lectures the unity; but, as we see, there is no unity except in the multifold, and that the multifold can exist only in unity.

LECTURE II.

DRIVING THE GOLDEN SPIKES.

WHEN the Northern Pacific Railroad was completed President Villard made the event memorable by driving a spike of gold where the last rail joined the two extremes. The evolution of humanity has been signalized at well-defined points of progress by its golden spikes. Nature antecedent, as I have shown you, approached by easy stages the structure of the anthropoid. She had at last the head sitting well forward with cerebral foresight; hands freed largely from serving in locomotion; and the germinal language of gestures and vocalization. The work, however, was far from being done. Instead of man's being created by a God, he has had for the most part to create himself. I should seriously fail of my purpose in these lectures if I failed to show you that by evolution we can account not only for man, but for all that man has become, and has done. You may readily trace customs, habits, beliefs, tools, morals, religion, literature, arts, backward to very humble origins in or before the beginnings of human career. The first cave-man who scratched the outline of a reindeer on a bone was the father of all etchers, engravers, and painters. The lineal predecessor of Mozart and Handel was a rude fellow who scraped an accord on the bones of a jackal he had slain, or blew a rough blast with the horn of a conquered ox. The traditions that point back to a golden age of wisdom and happiness find no facts to rest upon. On the contrary, the Chinese tradition is nearer correct, which affirms that their ancestors lived in caves, ate raw flesh, with only fingers to tear it; and that only after many ages great minds invented means for kindling fire, and making clothing of skins. Evidence points only to a primitive creature without fire, clothes, language, tools, or houses; and with only this advantage, a dawning consciousness of his needs and his wretchedness.

We may conceive several influences in operation to propel the anthropoid to become a creature of progress. First of all was that innate propulsion which from the very lowest forms of life ever pushed upward and onward; the inevitable purpose in Nature—the divinity that does shape our ends. Second was the influence of somewhat greater minds, that flashed out of the dead level. In her account of the Ainos Miss Bird tells us of one, Pipichiri, who had resolved not to drink the intoxicating *saké*. "We *must* drink to the gods or die," said they all. But Pipichiri said: "You say well, give *saké* to the gods; but do not drink it for them." What must necessarily be the power of one moral genius like this? Already this Aino youth had formed a small society pledged against drunkenness. Thirdly, we may be sure that circumstances of special misery and danger roused, at times, dormant energy to its highest purpose. The glaciers, abrading from the earth a feeble race, selected therefrom a hardier stock, and a vastly wiser one. Accident also must have conspired then, as now, to set in operation influences of mighty propelling force; as the discovery of a metal; or the isolation of a race on an island, thus relieving it somewhat from its enemies; or the invention of a simple weapon or tool.

Where was the beginning? where the biped with larger brains that could fairly be called no longer animal, but man? Geology denominates the present era Tertiary. Reckoning backward, we go down first to the Pleistocene; next the Pliocene, next to the Miocene, and then the

Eocene. These Tertiary rocks, about five millions of years in making, are the special home of the mammals. No traces of man are found as yet below the Miocene; although it is judged by many that his history really covers the whole of the Tertiary period.

But in the Pliocene era everything began to look more as it does to-day. The plants and the animals would seem familiar if we were transferred to that age. And there with the other creatures, was unquestionably some sort of a man. The last glacier age closed nearly one hundred thousand years ago; it had continued nearly or quite twice that length of time. Certainly before this period of ice these man-like creatures were pretty well scattered over the globe. The earliest definable race was coincident with the glacier drift; a feeble lot of folk that was obliterated by the growing cold, and by the hardier race that succeeded them. This hardier stock was bred of toil and harsh climate, and the last of them yet remain in Arctic regions as Esquimaux. The changes of climate were extreme. At one period ice lay one thousand feet thick over Great Britain, and over North America, as far south as Mason and Dixon's line; bringing in reindeer, arctic foxes, and musk sheep, with deciduous trees, in the place of elephants, lions, leopards, hippopotami, and palm-trees.

This poor fellow of the Drift had a sorry time of it. In the place of a climate as warm as Africa, extending as far north as Greenland, glacier eras rolled down over all the land, not less than five times. The survival of the hardiest, and therefore, under these circumstances, the fittest, evolved from this race their successors.

How long the cave-men roamed predominant over the Northern continents, or continent, for then land united the present continents, it is not possible to determine. But a third race, developed in the southeast, possessed of immense expansive force, began to push northward and westward. They ran over all Europe, bringing for the first time a decent degree of civilization. The cave-men had tamed dogs, and lived as nomads by hunting and fishing. This was far better than the Drift-man's condition, for he was not even a hunter, but lived in an almost even-matched struggle with other beasts. But this third race, the Iberian, had domesticated not only dogs, but cattle and horses, and they tilled the soil, raising barley, millet, apples, and quite a variety of other fruits and grains.

A fourth race from the northwest, probably essentially Turanian or Mongolian, appeared next on the scene; and fought with the Iberian for many centuries. This strife began, we do not know just when, but we know pretty well when it began to end.

About the time the Turanians were evolved in Northern Asia, or possibly later, the Aryans began to spread over Central and Southern Asia. With them begins strictly the historic period. For five or six, possibly seven or eight thousand years, the Aryans were confined to Asia. After that, about two thousand years before Jesus, they began to wave over into Europe. These were our immediate ancestors, and they are yet the controlling population of the globe. With them have always moved the Shemites, including the Jews. Whether these later races were evolutions out of the side of a general Turanian stock, or were originally developed like the Turanians out of the earlier anthropoids, and had lain dormant in Asia for centuries, can not be positively affirmed. But it is vastly probable that the glacier ages, and increasing coldness of the earth, caused two special and diverging lines of development from a single primitive race. To the North was differenced and bred a hardy, tough, enduring, but less nervous stock; to the South a stock less vital and hardy, but intensely more responsive to modifying environments. Out of the northern stock came originally the cave-men; and later the Mongols and Tartars developed from these, or were affiliated with them, deriving part of their blood from the

South. From the southern stock was differenced the Iberians, the Aryans, the Turanians proper, the Shemites and other races that were akin to these. The negro stock owes its origin undoubtedly to an entirely different original break with the primitive semi-animal life; to trace which is as yet impossible.

The five races named may be noted for the metals they used, or the material used for tools. The Drift-men used only rough stone chipped into the crude semblance of axes and spears. The cave-dwellers used also stone or bone, but polished it and ornamented it with sketches of animals. The Iberians began with stone, and passed on to the use of copper and bronze, while the later races inaugurated the age of iron and steel.

How do we know so much, or, possibly, we should say so little, of the older races? Mainly we learn about them by means of huge heaps of refuse left from their feasts. The Drift-men and cave-men were almost entirely confined to the sea-coasts, and lived for the most part on shell-fish. They lived and ate in herds, and the refuse of the feasting accumulated into large mounds, ten feet high, hundreds of feet wide, and thousands long. In these mounds we discover remains of shells, fish-bones, animal bones, charred fruits, and tools. The Danish name for these refuse-heaps is kitchen-middens or kitchen-waste, a name now generally applied to them wherever found.

Among the bones found are none of animals useful to an agriculturist, and no domestic animal of any sort, except a dog, about as big as a Spitz. The tools include knives, chisels, hatchets, and spears. Dark-clay pottery and powdered shells are also found, with ornaments of wolves' teeth, and beads of jet. The Iberians had gold ornaments, and began to till the soil. The more recent kitchen-heaps indicate advanced tillage, permanent homes, and many domesticated animals.

Again we can gather a good deal of information by studying the tombs of the stone ages. The Neolithic man built mounds often fifty feet high by several hundred feet long. In these the dead were seated at the east end in a crouching posture, and with them were placed pots of food, and tools. Frequently several skulls are found together, all broken but one, indicating that they were killed to become companions of the one who had died a natural death—probably a patriarch or chief.

These Iberians introduced a custom of building communal dwellings, or villages of huts, over a shallow lake, on piles. These old villages are frequently brought to our knowledge by the drying or draining of the lakes. Under the dwellings still remain the accumulated *débris* of waste and food. These houses were made roughly of wood, and plastered within and without with clay. The lake dwellers were in advance of the bulk of their kinsmen, and denote the pushing forward of incipient civilization. They not only raised grain and fruit, but wove a neat and coarse cloth of grasses and flax. The bone saw of the cave man became now a bronze tool; while copper axes began to take the place of stone.

This is the story of one thousand centuries; all the rest of human progress is packed and crowded into the last ten thousand years. The axe or hammer, the grindstone, the plow, these are the milestones of primitive man; this is the road to the school-boy of ten, who is a mechanic by heredity, a musician by birth, and a scientist of necessity. The axe was so valuable that it was wrapped in skins, and the art of weaving found no more valuable application than to protect those tools. On the axe of to-day I read all the history of humanity. Its steel edge is the work of the highest skill of the age of metals. On its heel, its maker's name shows that it passed by the door of Guttenberg five hundred years ago. Chemistry and the spectroscope wait on its tempering. With iron heel and a steel face it comes to feed my fire, that was unknown to the first inventors of the tool. The rude stone hatchet, through one hundred thousand years, has at last become the completest work of evolution, the right arm of the creature who with it has conquered the world.

The first axe was a rough chipped stone, tied to a stick with a thong of rawhide. Its purpose was doubtless to break marrow-bones, and possibly as a weapon against enemies. Rude, indeed, but he who made the first was a greater man than Franklin, Watt, or Stephenson. It would be an interesting study, could we find all the records, to note how the radical inventors, as time went on, were met by the enraged conservatives, who dreaded the subverting of established customs, sound morality, and the good old ways.

All our tools have a history like our own, of slow growth from rudeness to finer art and high achievement. The sewing-machine was born as a needle of bone, in the cave-woman's fingers, to thrust holes in skins of slain animals. The steel plow began with Iberians as a wood or stone dibble. The material marks the line of progress—stone, copper, bronze, iron—soon, we trust, to be followed by aluminium. To free the hand was the last work of Nature in making man. To supplement the freed hand with tools was the first work of man in the way of self-creating. It was driving the first spike on the road of human endeavor. Fighting-tools evolved hunting-tools; then spinning and digging tools, building-tools, weaving-tools, reaping-tools, and, at last, seeing-tools and talking-tools.

Let us see what else was involved in this elemental tool-making. The possessor of the first hammer or axe of stone had thereby increased power, and an increase of power gave him a position among his neighbors quite as prominent as Edison has to-day, or Vanderbilt. This would certainly involve jealousy, and as tool-making increased, the possession of enviable property must have led to strife. In that first tool was the germ of all the wars that have devastated the earth; for every one of them has involved property, and rights depending on property. War is not a natural condition of men, but a purely artificial condition. More than this, the possession of desirable property involved trade and commerce, and that involved bills-of-lading and intelligent methods of easy conveyance of facts. The stone most readily chipped for tools was found in only a few localities; and the quarry must soon have become a mine of wealth to its occupants. Excursions would no longer be made simply for food, but for implements with which to obtain food. Nor was this all; the happy possessors of tools or wealth brought out by contrast the misery of those who had it not. Knowledge was accumulating concerning self. The uniformity of individual conditions was broken up. As the charming story in Genesis has it, they had partaken of the tree of knowledge, and saw their nakedness. The propulsion for betterment was begun. Ornaments were accumulated; the body was adorned to indicate special dignity, and clothes were devised to increase comfort or comeliness.

There is not the least likelihood that the earliest anthropoids could kindle a fire. The earth was warm up to the poles, and there was little need of any other heat than could be secured directly from the sun, and from hot springs, and other natural sources. But the cave-men began at the North; were begotten, or differentiated, by cold that was steadily increasing. Glacier ages made terrible demands on vital energy. It is probable that clothing and fire were the invention of these hardy children of the ice. This was a great breach with animal life. No ape or other creature but man ever kindled a fire. All but man have been driven before the elements, unless able to evolve a denser fur. Woolly elephants endured for a time the change that slew their kin. Some foxes developed Arctic covering and instincts. The reindeer, among the deer, secured a power to resist the cold. But no rhinoceros or lion was able to adapt itself permanently to the change. They fled or were crowded to the tropics. Man devised a fire. The original method of kindling it is doubtless still practiced among many crude races. It is essentially by means of sticks twisted in sockets to produce friction. This was the second golden spike driven by man on the road to higher humanity. The stride from the oil-lamp of the cave-man, or his fire of sticks on the shore, to the fire that, under the boiler of a Corliss engine, drives with one thousand horse-power industries for the increase of the comforts and joys of Aryan Americans, is enormous. Yet how very recent is it that we got beyond the flint and tinder! The friction-match was invented in 1832; the smallest but most important factor of existing civilization. When we consider what a change the possession of fire must have wrought at the outset in the condition of its possessors, we do not wonder at the myths that claimed it was originally stolen from the gods; nor at the customs that preserved it with great sacredness by the hands of young maidens, set apart for that special duty. Nor can we wonder that fire gradually became one of the gods, and these maidens became vestals, who served not man but the Divine Spirit of Light and Heat. For, involved in this possession of fire, was something vastly greater than comfort. It necessitated the study of force and forces, or what we now term physics, and it was impossible for even the primitive inventor to escape an association of fire with the sun; and so the study of the heavens and cosmical forces began. The immediate results were a very crude natural science, and a science of the gods quite as crude, but yet of great importance. For, many thousands of years later, Kepler, imagining the stars are symbols of a Trinity, strikes out the great methods of planetary motion, and Newton is inspired by the law that is the soul of that method; and, at last, Tyndall shows that heat is but a method of motion, and Joule that all force is conserved; the unity of the universe, in substance and order, is established; and out of this new and infinitely-related science rises a new natural theology and natural religion which is the religion of evolution.

Essentially, we might presume that the hardy races to the North begotten, would evolve those arts demanded by climate, such as clothing and kindling fires; while the southern stock would develop in the way of finer arts and commerce and agriculture. Essentially this is true. Except from local and limited causes, the northern race has always remained nomadic; has never advanced beyond the pastoral life, and has had only a rude conception of art. Its tools have been few, its science and theology simple, and its brain-power limited. What it has ever learned to do it learned early in its career, and has learned little since. The southern race or races, on the contrary, developed the whole of those arts and industries that sum up in the word civilization.

But there was an influence stronger even than climate and heredity that entered into this competitive trial. The central and western parts of Asia furnished a great co-operative agency to the southern stock of men in the way of fruits, vegetables, and cattle, and beasts of burden. The cave-dwellers never secured the service of any animal but the dog, and must live mainly on flesh and moss. Later, Northmen tamed the reindeer, and held flocks of sheep, and still later herds of hardy cattle and horses, that originated elsewhere. This domestication of animals, and reducing them to service, was an achievement of a master. It gave to mankind its next great propulsion forward, establishing man's position as king of the world. We may set it down as the third of the golden spikes that were driven on the road away and away from the brute.

It would be impossible to enumerate all that was involved in the domestication of animals. It was the first subjection and utilization of force not our own. The use of wind-power would soon follow; and then the discovery of steam-power and of electricity as motors was but a question of time. But above all, the use of animal power made it possible to carry on tillage and inaugurate rapid commerce. Our cosmopolitanism was well under way on the back of a camel, or an ox, or a horse. Add to this that now to the meager food of the earlier age were added the cultivated fruits and vegetables, and the cattle of the yard. It was no longer necessary to roam over vast areas for sustenance, it could be had at the door. The permanent home displaced the temporary hut, and with the home began the village, and all that collocation of art, and industry, and enlightenment, that constituted cities; and from cities has finally sped, on rails of steel and tongues of wire, to every hamlet.

The primitive anthropoid could have been possessed of no distinct articulation; but only of a language of signs and ejaculations. These he had in common with all animals; for nearly all creatures are able to convey their emotions by sound. But having made tools, his relations to artificial objects was added to his other relations to objects natural. We value highest that on which we have expended most energy and care. You will thus see that the natural desire for communication became intensified. The universal purpose in Nature became concentrated in the direction of language. It was absolutely necessary that effort should first be established before organic results would follow; but if we suppose effort to be intensified, the function would soon establish itself in vocal cords, and such other changes as were necessary. By the verdict of anatomy it was impossible that there should have been articulating language until the brain had what is now termed the third convolution fully developed. and until a special tubercle was possessed by the throat. These, the animals have not, neither the anthropoid man. But at some period, no doubt in connection with the cave-man, these organic changes were accomplished. This was the fourth golden spike on the king's highway.

Add, now, the communistic social nature of the apes and anthropoids—natural chatterers—and you have all the necessary propulsion leading to the organic development necessary to articulation. It is not easy to make too much of the propelling force of the pleasures of speech. Watch an infant as he begins to talk. How he enjoys making new sounds. He revels in unformed chatter. Nor is mere talking a lost joy to adults. The first flint-chipper not only needed language, but he had entered on a new emotional career. New circumstances and new things constantly excited him to new sounds. Language, originally, is the expression of emotion ; it is the strain on the nerves and cords of a strong feeling. The cord responds with a modulated sound. Primitive language never went beyond the emotions and simplest needs, with a few nouns and interjections. The root-sounds of all language have, no doubt, remained unchanged. Our babies say, not pa, pa, but ba, ba, like sheep and calves. My horse comprehends sounds for caution, reproach, admiration, censure. The camel is gifted in the same direction ; so also your dog ; but, above all, the monkey. And they all have the germinal sounds of emotional speech. The African negro cries mamma ! mamma ! when terrified. Some Indian tribes cry ana ! ana ! when suffering. South Africans, and the generality of savage races, click with simian sounds. The first stage of language was probably an enlargement of emotional sounds ; the second was the use of the same sounds with analogous meanings.

The date, or an approximate date, of the origin of articulation is thought by physicists not to have occurred over twenty thousand years ago ; for the older races, and the earlier members of continuing races, were wanting in the third convolution of the brain, associated or correlated with speech, as well as a tubercle of the jaw involved in articulation. At all events, less than twenty thousand years have been occupied with the development of all known languages. Less than ten thousand years cover all accumulations of such stores as language carries. However difficult it may be to chasten the imagination to consider our ancestry as inarticulate for at least four fifths, perhaps nine tenths, of their career, yet it must be allowed to be true. You can hardly conceive of the earlier condition of the human being otherwise than that of a traveling animal, with originating power largely developed, and a peculiarly skillful vocalization, accompanied by a science of gestures. Savages, to-day, are able to communicate with ease by signs where they do not understand a word of each other's language. Articulation is a refinement of speech of vast value, but not necessary to quite an advanced humanity.

The surprises of a growing cosmopolitanism, finding vent by the vocal cords, slowly identified ideas with permanent sounds. The progress must have been immensely slow, for the Yorkshire laborer of to-day uses less than two hundred words to express all his ideas. The Australian has even fewer words, and yet all that he needs. He talks mostly by pantomime. It must be also remembered that primitive races are far less inclined to talk, are more reticent when possessed of language, than are civilized races. Words, however, were the fallen tree that served as a bridge over which mind was destined to travel into the vast regions of abstract reasoning. The first word-makers had an immense advantage in the new life-struggle, which was destined henceforth to be, not with beasts, but with moral and intellectual forces. Contrast the group of cave-dwellers, in some cave or hut of Old France, fifty thousand years ago, half clothed with skins, tearing raw fish with their fingers, or breaking the marrow-bone of a musk-ox with a stone hammer, chattering and growling, with a session of the Academy of Science, in Paris, discussing, in the language of most elegant evolution, the remnants of that very feast, dug from the *débris* of the neighborhood.

But we must not forget that these primitive men, inventors of speech, were not such savages as most of the degenerate races of this day. The oldest literature is poetic, and song has always preceded prose. The first words, doubtless, expressed joy, surprise, delight, as fully as pain, anger, and want. The natural language of emotion runs all the way from the vibration of a leaf to the song in a thrush's throat, or "Home, Sweet Home," sung from the soul of Jenny Lind. Song is Nature's spontaneity—in birds, in insects, in animals, in man. Probably the earliest words of man were the spontaneities of his soul, and more full of song than of thought. The negro is less changed than other races, and the negro is also more melodious. I have no doubt man sang before he articulated.

When at last a poem was produced, what must have been its value! How the young souls listened to their first Theocritus! No alphabet for the first Homer! No type! The listeners caught the sounds, and chanted them after the chanter. It concerned those things that most stirred the minds of the singers—the stars, the spring, the dead, a flush of food or a famine, and later, gods or war. The first poets had the authority now held by books, by the printing-press, the authority of inspiration. Their words became the laws, the customs, the religions. It was the voice of the gods.

So at last the organs closely related to eating and the sustenance of vitality evolved to the higher service of reason. The belly was no longer monarch; the brain began to rule. The axe was the tool of the hands, language the tool of the brain. Out of the era of increasing human emotions rose, as spontaneities no doubt, several forms of expression. The Northmen developed one class of speech, the Southrons another, or many more. In the progress of events, and the growth of demands, language fitted itself to pictures and became written speech, then to symbols and to signs, and finally, under the pressure of commerce, an alphabet was invented. Then, speeding on with the glad news of man's escape from brute life, language fell into the dies of Guttenberg; with Caxton it declared the hope of a united race in the first newspaper. Nor did it stop till, having harnessed steam and electricity, it flashed around the world the wit of Emerson, the learning of Darwin, and the song of Longfellow. The invention of language, the invention of written characters, the invention of an alphabet, the invention of a printing-press, the invention of the telegraph, are successive steps in the triumph of mind over matter.

We must pass now to consider the evolution of custom and social order. The original anthropoid-being was hardly a hunter, but took his chances in a general hard-scrabble with the rest of the mammals. In the Congo Valley there still exist tribes that neither catch animals nor domesticate them, but subsist on the spontaneous products of the soil, and such insignificant prey as falls into their hands. They neither wear clothing nor comprehend the simplest ideas of progress. The primitive inhabitants of Europe had no incisor teeth; but their jaws set squarely together, with flat edges to their teeth, showing that they ate mainly herbivorous food. Thousands of years elapsed before the wit of invention gave man any precedence in the forest.

The era of hunting followed, and was of enormous duration. Beyond it the cave-men have never progressed. It not only put men in the way of more and better food, more easily provided, but led to the domestication of those animals easily tamed. This power, once secured in the forests, led men from the sea-coasts inland everywhere. The increase of domesticated animals led on easily to pastoral pursuits. Man became a shepherd, a life so comfortable, and in some respects delightful, that with it developed poetry, and many of the simpler forms of art and domestic industry. With vast herds and flocks, a vast family was a possibility. The patriarchal order of society was a natural consequence.

Among the historic threads that run through the shepherd's songs and hymns are tales of an innovating class, that seized the soil, and drove the shepherds from a free range of the pastures. These people, instead of giving the gods lamb to smell of, gave them fruits and vegetables. They were a profane set, who did not respect the past, the good old ways, but took the fertile valleys for their plows, and built permanent homes. These were the first farmers of whom we have any account. Cain was the farmer, Abel the shepherd; Abel was the pious conservative, Cain the radical. Fortunately, God likes apples, and pears, and corn, and wheat in these days, as well as he likes mutton and the firstlings of the flocks. Cain is triumphant. Farms are the outposts of advancing civilization; the basis of all that is enduring. Tillage also multiplied once more the supply of food, and made it secure as well as more varied. A million farmers can thrive where shepherd-life would hardly sustain a thousand, and hunting not one hundred. In farm-life woman ceased to be property, and became for the first time partner. The oldest term for woman among the agricultural races was the weaver; for daughter, the milker. For seven thousand years these words have flowed down, through many idioms, but essentially unchanged in form and in meaning.

The original family was the basis of all social development. The sexual bond was the primal tie involving a community of interests and responsibility. It underlay society. The initial of humanity was not an Adam, but an Adam's family. The poem of man created first, and woman later, is not defensible as history. The sexual relation originated long before the anthropoids and man. In the family the oldest male was papa and lord. Wives and children, above all, were his property, as also the gods; for the earlier gods were but the ghosts of dead members of the family. A visit to one of these families we can make, and not draw largely on our imaginations. The people are more hairy than ourselves, and of shorter stature. Their arms are proportionately longer, their legs shorter and thinner. Their stomachs are distended to do service as pouches when food can be secured, and they can be filled. They must often carry the supply for a week. They eat anything without qualms; for our qualms are the result of imagination, which these folk have little of.

In this primitive family is all that has since differentiated into Church and State. On the one side it has developed the Church and religion and piety; on the other, the State, with government, school, and civil institutions. But the real evolution of Church and State is almost wholly within historic times, or since the rise of the Aryan race—a few thousand years before our era.

The State came out of the family function much in this way. The patriarch included in his will all law; but that very exercise of will created in time customs, which he recognized as directive of his will. Custom is the basis of law. All statutes are customs, confirmed by legislative edict. Disputed custom combined with common dangers to give force to public opinion. This at an early date eventuated in family councils. The original Sabbath seems to have been a Council Day. The customs that grew up from these semi-democratic assemblages are yet traceable.

Somewhere previous to seven thousand years ago, it had come to be a rule of our Aryan fathers, in India, that society should be divided into three sections. The young, until twenty, were pupils—students of morals and customs, of duties, and obligations; from twenty to fifty all males were to be engaged in affairs of public interest; from fifty they were retired to forest life. The young were to learn; the middle-aged act; the old advise. The patriarchate had already lapsed with this branch of our ancestors. In its place was established the communal family. All property was held in common, except what was directly in use.

Land, cattle, and tools were owned by the joint family. All occupied the same house, and ate at the same table.

The next stage of evolution shows us the dissolution of the strict commune, and the private possession of certain movable property. Each family occupied its own separate house, and there was no longer a common table; but land, cattle, and tools were still owned in commonalty. Each Spring these were reapportioned to the different families of the community.

This social state was, as you see, plastic, and evolutionary to a high degree. It allowed of a coalescence into tribes, and it was liable to induce that expansiveness that would lead to wars. Tribal government, wherever it eventuated, led directly to the feudatory, or government of the stronger. Chiefs most successful in war became protectors or masters of weaker neighbors. The kingdom naturally followed as a coalescence of tribes, and the obliteration of the family in affairs of state. I do not, of course, undertake in this brief synopsis to do more than give the general programme of social evolution. Sooner or later all societies pass through essentially the above forms; facing that organization which is as yet the highest, the Republic, in which families constitute towns, towns constitute larger aggregations; these in turn co-operating as States; while States centralized constitute the Republic; finally all free governments are submissive to common moral obligations and common political regulations, which constitute international law, and produce a unity of mankind. So the family once more finds itself in customs that gird the globe.

Meanwhile, the original family emerged in a different direction, such, in the main, as it is to-day—a modest but beautiful nesting place for souls, where the common table gathers a lovely and holy group, whose richest property is the ever-accumulating store of moral conviction and intellectual enlightenment; and in which are concentrated, in the germ, those ideas that, expanded to the Cosmos, cover our best ideas of Father Infinite, Love Infinite, and Hope Eternal.

On the other hand, the Church evolved from the primitive family by a process quite as natural. The patriarch was originally priest, as well as lord; and, whatever worship of the gods ensued, was at his hand or direction. But at a later date a division of offices grew up. There was a head of the family as a worshiping concourse, selected for the special service of the gods; and another head for all secular affairs. Both were papas or patriarchs, and the name has in several instances clung to both differentiations. Essentially there were two families in one, the spiritual and the secular; and the conflict between the two, which immediately began, has extended through all history. So we find the first element of the Church, which is a church family.

The second element of a Church is a God. Of course, you reply, it involves the worship of God; but bear in mind that the primitive man had yet to create his gods. The facts that met his mind were of four great classes: those that concerned his life and safety; those that concerned his food; those that we sum up in the word death; and those that we include in the word life. Out of these facts he must create his worshipable beings; and so he did. He worshiped bears and serpents, as representing dangerous forces. He worshiped the vine, and cereals, and vegetables, as representing food. He worshiped sun, and fire, and the seasons, as representing life and quickening. He worshiped his ancestors, as representing that mysterious change which to them was not death, but transformation. For the most part, primeval worship consisted of reverence to the spirits of dead members of the family. These were still members of the family, but now exalted to mysterious power. They lived in echo-land, breath-land, ghost-land, or sleep-land. They were naturally still interested in their families, and must be fed and cared for, or their anger would be shown as in life. In war their images, which they were supposed to occupy, were carried about, and they were expected to take part in the fight. The original idol was merely a substitute furnished a ghost, for the body that was buried. Jehovah was either an ancestor of the Hebrews, or borrowed from some other nation; as England borrows George for a national saint.

The third element of a Church is an altar. This was originally the heap of stones over a grave, on which was daily placed food for the departed. To feed an ancestral spirit was the most sacred duty. The truly pious fasted themselves that the gods might eat, which was the origin of fasting as a religious rite. On the modern altar you also burn sweet savor for God, and there you place the bread and wine, when with God you eat a communion supper. The earliest Christian altars were chests, in which the bones of martyrs were kept; and to this day any church that has such relics places them under the altar. So it happens that the primitive grave becomes the Christian altar.

The fourth requisite of a Church is a temple. This was at first a cave; later a grove, as with the Druids; or a "high place"; but always a burial-place. Gradually the pile of stones on a grave became an arch of stones, or cromlech. These developed into mausoleums or tombs. Now the food was placed inside the stone structure. These changes caused the bitterest of strife between the innovators and the conservatives, the radicals and orthodox. But in the end orthodoxy was regularly defeated. Rude temples began to take the place of tombs, which sheltered the worshipers as well as the dead. These developed finally into superb works of art, and then the god of the temple became a great god, or god of gods, and began to suppress his rivals. Religious wars began to foul the world with slaughter; but men were thus well on the way to monotheism—at first the worship of an autocratic creator, but of late the Supreme Spirit and Purpose of the Universe.

The fifth element of the Church is a ceremonial of worship. Primitive worship was very simple. It consisted in some such service as placing the idol on the greensward and dancing about it. After this came a feast. "Grandpa" was supposed to take a share in the festivities. The religious dance antedates all other ceremonials, and it still survives in some modern churches. Our blessing before meals is a survival of the invitation to the gods to partake with the family. When the greater ritual passed over to the temple this lesser rite was retained by the family. The temple meal became in time a vast barbecue of oxen, sheep, and birds. The gods partook the "sweet-smelling savor," and the priests ate the rest. Piety became measurable by contributions to the temples. In return, the gods were expected to be generous, and assist the worshipers in all matters, temporal and otherwise. In time it became a belief that the gods entered the food, and whoever ate of it ate eternal life. So the Church supper of to-day gives to the partaker the body and blood of God. Eat it and live; but whoso refuses it refuses salvation.

The final element of a Church is authority. This, at first, was naturally due to the relation of the priest to the gods. Inspiration was cheap; miracles most natural. They were, indeed, more common than natural events. The priest was thus endowed with the power of the unseen and mysterious. He spoke in the name of gods. He disposed of the future lots of the living. His cajolings and threatenings expanded into eternal heavens and hells. The imaginations of ten thousand years playing on these has made of one a city of gold and glory, of the other a pit of fire and torture. So the worst effect of the craft of the priest has been the establishment of a code of morals based on obedience to the Church, instead of obedience to the right. Finally, authority became identified with books or Scriptures. Earlier writing, whether song, proverb, history, drama, or fiction, was sacred as it was wonderful. As a consequence, the Sacred Scriptures of all times have constituted a curious and incoherent jumble, that it has taxed succeeding ages to read sufficient sense and religion into to preserve from ridicule. Homer's song reshaped Greek theology. Milton and Dante sung into Christianity a complex eschatology. Expounders supplement books, and soon the expounder is scarcely less authoritative than the writings he defines. Then sects clash, each with contending commentaries. The more ancient interpreter is orthodox, and, clothed with the righteousness of his cause, he deals death in this life, or damnation hereafter, to his opponents. But in turn he goes to the wall, and a new creed becomes authority.

Thus, out of the primitive family evolved both the State and the Church, two organisms never at peace, yet often in alliance, but both agreed in the maintenance of power by the claim of divine right. For ages the Church dominated, with more or less autocracy. At last, in the tenth century, the Christian world was a hierarchy, giving away States as private baubles. The reaction, however, soon came, and the State is to-day supreme in all civilization. Our faces are evidently toward the days when the school, involving moral as well as intellectual culture, will be the essential Church. The worship of the true, beautiful, and good, which constitutes the ultimate religion, can only follow knowledge.

I pass now to consider the laws that have governed human progress. Evolution reached in man a degree of strange equilibrium. Heredity almost absolutely controlled life. Each generation repeated its predecessor, with but slight modification. Man's volition was almost identical with instinct. The story seemed about told. The cave-man of a hundred thousand years ago made the same tools, drew the same pictures, wore the same clothes, lived in the same huts, and had the same habits as the cave-man of to-day. The Australian performed one miracle when he threw a boomerang; he has done nothing since. Primitive life was a life of instinct. It made few efforts, few trials, but did with great exactness what it did do. But the doom of man was not completeness and perfection. Slowly changes of climate and other influences led to new conditions of life. Gradually accumulating knowledge led on to a wider range of effort. Less was done perfectly; more was done. More of the new breaks in on our judgments in a year, than startled primitive man in a thousand years. The deepest seas, the remotest skies, and the earth's depths, conspire to prevent us from dropping into instinctive routine. Genius is that height of perceptive and combining intellect that abhors doing the same thing twice; and will not do it twice alike. The apparent equilibrium of creative forces became at last the most versatile, tentative, and unstable of all life conditions, as manifested in the high-wrought nerve organization of the man of culture.

The second law of progress followed close upon the first; that is, spontaneity of evolution. Ideas beget one another. They form a series of generations. All races pass through essentially the same stages of mental and moral development. So it happens that the same idea, or invention, or discovery, has come about in many parts of the world at the same time. Strange views break out all over the globe by apparent spontaneity. Hardly ever is an important discovery made by one man alone. The correlation of force was simultaneously announced in three countries. The discovery of Neptune was announced by a Frenchman coincident with its determination by an Englishman. Chloroform was discovered on the same day by two men independently. Darwin, and Wallace, and Haeckel, without intercommunication, propounded simultaneously the hypothesis of evolution. It is as when three mountain-tops of equal height catch the morning sunbeam at the same moment. When races or individuals reach an equal height they touch the same ideas. Egyptians, Chinese, Mexicans, and Peruvians, all independently discovered the making of bronze. The Chinese, the Mayas, and the Germans invented the printing-press. Confucius, Zoroaster, and Jesus independently promulgated the golden rule. Applied to primitive man, this law of spontaneity accounts for the fact that several languages, with no root affinity, arose in different parts of the world. At a certain stage of human evolution, corresponding to childhood, language is a spontaneity. It was probably the same with tool-making. All religions have followed similar lines of evolution, and reformations, and decay.

There is in human evolution also a great deal of what may be termed periodicity. Ideas and lines of thought run their courses in given periods. Religions have from the outset had a period of about five hundred years. Brahminism, itself a reformation of an antecedent faith, burst out simultaneously over Asia about 2000 B. C. The law-giving by Manu in Southern Asia, by Tschow in Eastern Asia, and by Moses in Western Asia, was spontaneous and simultaneous about 1400 and 1500 B. C. The song and psalm era of David and Homer was about 1000 B. C. Buddha in India, Confucius in China, Socrates in Greece, flashed forth about 500 B. C. Five hundred years later, Jesus, concentering all lines of evolution, symbolized the cosmopolitan unity of all future development. 500 to 600 A. D. the papacy was established, and Mohammed began his crusade of monotheism. 1000 A. D. the completed hierarchy was established by Hildebrand; 1500 A. D. the Reformation by Luther was kindled. As we near 2000, it seems certain that we are approaching the culmination and establishment of the age of Reason as the basis of Faith. Nature steadily moves on intelligent lines. It is not a bundle of haps, or of disconnected forces, but all nature, at all times, in all places, operates for definite ends; exactly as all the complex functions of the human body are after all a unity, and act with spontaneous and simultaneous concord. Ideas are but points in the evolution of one life; and, though we see these ideas through the mediumship of different minds, they are, after all, one idea.

Another law involved in human progress is that of irritability. Antagonism has been the lever of advance. Idea wars began as soon as ideas took shape. They displaced the mere brute struggle for existence. The latest achievement of reason is toleration. We have now all-sufficient antagonism and stimulus in the problems of science. Every new idea was ever welcomed into the world as an ungodly innovation. The old was sacred; the new was profane—that is, opposed to the altar's ritual. Reason, which is essentially comparison, and therefore critical, begets at once conflict. So it is reforms have been struggles, and cost the world its sweetest lives; nor have they ever ended at the point for which they were inaugurated. Monkeys can get on with their philosophies and religion without conflict; but men can not, until they have reasoned reason's broadest demonstration—equal rights. Men began to live in the herd; the breaking up into individuals was a slow evolution. All religions, all philosophies, all parties, have sought to establish an eternal camp at some mile-stone of progress; but all have failed. It is difficult to grasp the full force of this idea—the individual. Is there any difference in mice or minks; among butterflies or among beetles? In a hive of bees all look alike and act alike; but higher up there is more specific individual character. Dogs are not alike in reasoning power or in instinct. Cats are peculiarly unlike in our companionship, but shockingly alike when left to their own ways. Men of lower races are much of one pattern. Civilization is an individualizing process; so in turn men of intense character have done most of the propelling that has constituted civilization.

The final law of human evolution is that it is, from the nature of man, a slow achievement. The fact that in the development of structural life before man a large part fell into degeneracy, and nearly all the rest dropped functionally into automatism—this fact is carried on into the intellectual evolution that follows man. There is a constant tendency to let the reasoning energy run down into instinct or human automatism. A new lesson, well learned, and the masses fall into the practice of it as a habit, and are satisfied. It is their land's end. Whoever would go farther is a disturber and atheist. Religion thus becomes a mechanical evil, losing its moral character in ritualism.

The general course of progressive thought has been rigidly on this line: 1. A growth of knowledge of natural phenomena, and attempts at referring them to adequate causes. 2. This effort, involving some positive results, ends in an agglomeration of myth and science, as theology. 3. A code of arbitrary morals arises, based on the extent of existing knowledge and mythology. 4. Another advance in the way of increasing knowledge attacks established ritual and belief, ending after bitter strife in a Reformation. 5. The new heresy having established itself as orthodoxy, loses its own plasticity, and is assailed in turn by a later system of knowledge and faith. The gods of the old faith in each case become the devils of the new. Up to this century all progress in thought and knowledge has taken the ultimate shape of theology; all science has sought a compromise with mythology. However, through all the revolutions there has been an evolution; and all religions have moved on the king's highway to higher hopes and purer purposes.

That progress must be slow, and by easy stages, is a physiological and psychological necessity. The brain can not retain its equilibrium in connection with too sudden and rapid revolution. This is especially true of uncivilized races. The brain of an African is driven to insanity when brought in contact with the outermost whirl of European activity. Yet human history has always involved, like antecedent history, many startling transitions. Large modifications have followed apparently insignificant causes. A leap in the evolution of structures, I showed you, was within the provision of natural law. It is the same with intellectual and ethical progress. The alphabet, the press, the steamship, mark propulsions of such an extraordinary nature; but never has human thought speeded with such continuous leaps of inspired progress as during our own age of science. Freed from the necessity of conforming our knowledge to a preconceived theory of causation, mind has achieved in one century the work of a millennium.

Strike the golden spike! master workman, on the way
Humanity is traveling with the traveling of the day.
Strike the spike of gold! as struck primeval man,
When a highway Godward, to travel he began;
When with celt of unhewn stone he scored the birth of mind,
And the first mile-stone was set that left the brute behind.

Strike! strike! master workman, on the road to kinglier men;
Scarce the spike is driven ere thou must strike again.
For the road thou buildest is a road without an end,
Leading where with human effort hope and reason blend;
Looking from each station adown the road of time,
Changing folly into wisdom and discord into rhyme.

At his station on the shore, the gray Phenician reads
The alphabet, his wit devised for hurrying human needs;
Still farther down the ages John Guttenberg strikes strong,
With lever of the press, a spike through ancient wrong;
And once again James Watt to speeding truth adds speed,
And across old bigotry writes a broader human creed.

Strike the spike of gold to bind the bands of steel,
And thus the age of iron to the age of gold anneal;
Through the heart of elder evil, the love of brutish strife,
Drive the spike of human progress and a loftier, truer life.
Gird the world! The nations blend! Peace and love proclaim,
To evolve a nobler man is the world's predestined aim.

LECTURE III.

JESUS THE CHRIST OF EVOLUTION.

EVOLUTION has in world-making concentered its forces in suns as well as minor worlds, and from them distributed its power over vast areas of space and time. In the development of life types were established by a similar concentering of forces. The saurian represented a massing of power, which was later distributed, and differenced in sea and air. The phenocodus was a reservoir, from which went out the higher forms of mammals. This is true in a larger sense of the accumulations of intellectual and moral power since the development of man. Great men stand at historic points, at their birth receiving and concentering a large range of influences; and by their lives distributing the same widely as human benefactors. This was true as we have seen of Abram, of Buddha, of Jesus, of Mohammed, as well as Luther and Darwin. When an age ripens it ripens in a man or group of men, and in that man or men is the seed of the coming age.

Among all historic characters, however, there is one in whom evolution concentered more of human history than in any other, and from whom it has rayed out more widely and beneficently. A study of Jesus is absolutely essential to a comprehension of evolution in human character, and the progress of the race. Evolution alone is adequate to explain his position and his influence.

A false conception of Jesus is a necessity to one who looks on the world as a wreck, and man as the mere flotsam and jetsam of a moral break-down of divine purpose. To such, an unselfishly great character, with heroic proportions, is a miraculous product. He can not be natural, for "the natural man is bad." Nature has, in his estimation, no tide of humanity that flows toward perfected ideals. A false theory of God, and of man, compels him to disrupt history, to take Jesus out of the natural genealogical line of our own fathers and mothers, and our own better hopes and nobler deeds, and set him down on a cold throne of supernaturalism alone. A man he was, but no other man ever was of the same sort; born of a woman, but begotten of a God. He was man, but not of the children of men—a strange abnormal product, bringing new forces from another realm supplementary to those previously at work in our world.

Who can nestle close to a God? Who knows the heart of a God? It is sufficiently difficult to understand men. So no sooner have these men made Jesus to be a supernatural product than they give him all natural qualities; and, not then feeling sufficiently the salvation of sympathy, they conjoin with him Mary the mother; at last, with the fullness of the masculine human, and the fullness of the feminine human, they clasp hands in love and hope. It is, after all, the human that saves them. Theoretically, Jesus is not one of us, but a graft; and there can be no really good human fruit, no holy purpose, no evolution of salvation, except it occurs in those limbs that grow from that graft. Practically, however, men never believe this.

I wish now to show you how we meet Jesus in the historic and truthful way; and how from another approach we gather the full import of his life. It is true that evolution as a scientific theory did not exist in his day, but evolution as a fact governing life did exist, and I wish you to see what Jesus was and is from that standpoint.

We must begin with the hypothesis, which is pre-eminently that of evolution, that humanity is not a degenerate product of Nature, but that it has, from the earliest anthropoid, risen in intellectual and moral power; that the race is still rising, and is to rise, for an indefinite future. Let us take history as it is, and not inject a scheme of theology, and a preconceived anthropology. Man from the outset has passed mile-stone after mile-stone of hope, and has, from a herded beast, become a Franklin, a Gladstone, a Humboldt. With this view how is it with Jesus?

At a casual glance, with little study of the particulars of the case, but with a profound apprehension of human history, the answer would be, Jesus is one of the family, magnificently gifted with a genius for human sympathy, a man who above all things loved human nature. I do not mean loved in the vulgar sense of the word, which is only, or for the most part, a regard for others for selfish ends. Such love is a passion, either to secure sympathy, or to devour the object of love. Jesus was master of a higher sort of love, not at all self-seeking, or rather seeking self in others. Let him stand in your mind for one moment alone with his own life history. I think you will agree with me that the fullest definition of him would be, he loved others not for his own sake; he loved the poor not as their master, but as their fellow and helper. He did not inaugurate, but he grandly demonstrated a gospel of humanity. This gospel was preached before him, but he stands out incomparably as its greatest Christ. He reduced all moral obligation, in theory and practice, into love for man and for God—and as love, or bene-volens, his religion has had its sole value to the human race. No one ever lived with less reverence for ritual, or less regard for forms of worship. Those, however, who have looked on him as a product out of Nature, have necessarily involved this law of benevolence, and salvation thereby, in a tangle of redemption from the wrath of an angry God; and to-day they can do no better than tell us that this rich, full love-soul is to end his career of beneficence as a judge and executioner of those who, loveless and hopeless, have never felt his love, nor even heard his name. So it is that the whole tenor of the teachings and life of Jesus is reversed, and what he aimed to do they recant in his name. I do not see how this can be otherwise from their premises. If man be a fallen being, under the wrath of God, a reign of love can not be continuous and universal. You can not, you ought not to love a race of disobedient beings, rebels by act and by nature. Jesus's grandly human idea of lifting by sympathy is turned perforce into an effort to get around the deserved doom of sinners, and to rescue a few by some intricate plot of belief and substitution. Evolutionists are freed of this terrible necessity. To them the love in Jesus is simply a human power, the yearning of an extraordinary soul to carry others on his heart.

This is an unstudied, but sympathetic view of Jesus. It is now our duty to study the facts of history, and see how they can help us in this consideration of a person so extraordinary that he has identified himself with an epoch. For you may be sure, in the study of any human being, that he is the result of influences that have accumulated in a long tide of evolution. And you can never comprehend the man, until you apprehend the force of the events that compelled his existence.

The facts of evolution bearing on the nature of Jesus, may be thus summed up: Man had existed on the globe for a period of vast length, reaching back of the Glacial epoch, when his structure and function were anthropoid, but not strictly human. His career was at the first like that of animals, a struggle for existence. Anything like a mental career, or a moral development, he did not have until within the last ten thousand years. He made no history for all the earlier period. He built no cities ; had no ships ; invented no written language, and, for the most part, no language at all. His characteristic was a physical struggle to get food, and defend himself from animal foes. Mind was absolutely subservient to physical needs; and there was no mind of any other sort. The type of the primitive man is in large degree preserved in the lower races of to-day. A few thousand years before Jesus there was a glimmer of intellectual life. Very slowly man was creeping up toward a new sort of existence. Worship of ancestors, and of the forces of Nature, begat a few forms of worship; and that begat a class of men or of women set apart for conducting such services. These were priests. The rest of the community were warriors. The latter represented the brute struggle for existence; the former represented something besides fighting. At this differentiation of the earliest man, began the first historical trace of intellectual evolution. From that day to this, society everywhere has been divided, under all circumstances, into the class that struggles for physical life and its requirements, and the party that struggles for another sort of life. The priests, no longer fighting, set to thinking; poor thinking it was, but, for all that, it was an uplook. One natural tendency was that they conflicted with the warriors for influence and power. It was the clash of cunning with force; craft with strength. Then began the downfall of brute force, which is not altogether down as yet. The priests planned and schemed, and naturally they claimed to be directed by those dead ancestors whom they served. The dead were many of them already considered as great forces, and held in reverence as such. So, curiously enough, a warrior, who alive was no friend of the priest's assumptions, dead, became his presumed ally. It is very palpable what an advantage was on the priest's side. He could summon the dead to his aid. He spoke in the name of the gods, precisely as a priest does to-day. It was brain against brute force; and brain won its first battle. No mean victory when you think of it as a break from the purely animal life that the world had heretofore seen.

Brutes men yet were, but they had scored one for becoming something else.

The priests and the warriors fought it out, no one knows how long, not always an open battle, of course, but a social friction. Friction gives heat; heat is a stimulus to mentality. The result was a gradual gain of religious ceremony that formed rude art. To us this art would be noise instead of music, and silliness instead of good taste; but they carved rude images of the dead, and by and by rude images of their thoughts. What is the image of a thought but words in picture forms? And that was just it. They had begun, hardly knowing it, to write. That is, they wrote a picture instead of letters: not c-o-w for cow, but a rude outline of a cow. Very small affair to-day; but then it was as important as printing is now. It was man's second victory over brute force. He now had not only begun to think out of a mere struggle for existence, he had also begun to tell of it, to make a record of what he thought. So thinking will gradually get to be a great power, and by and by set up a kingdom over the earth. You can easily imagine that these creatures, thus rising out of the purely physical, will do something better yet. But standing there, seven or eight thousand years before Jesus, could you foresee the telegraph, when thought shall command the lightning?

This mental life, involving some rude morals, already had germinal art and language. This involved an interchange of thoughts; that is trade and commerce. For what do you do when you trade but buy and sell ideas? A bushel of corn is more than a bushel of ideas. A roll of cloth off the looms at New York Mills is the thought of thousands of men for thousands of years. The ideas piled up in Hugh Glenn's store are not all on the book-counters. Every clerk is handling, measuring, weighing ideas, and folding them in their wrappers. The cashier handles vast volumes when he sends me change for a dollar bill. So ideas began to circulate; that was trade. Trade sharpened wits, and ideas grew more complex and masterful.

Five thousand years before Jesus, commerce had led to tribal life; had built ships, domesticated horses and camels and cows, and built great cities. But commerce was hindered, and grew restive as it grew powerful. It not only carried ideas about, but it demanded ideas as a return cargo; that is, it amazingly quickened thought. Agriculture was soon to give it fruits and vegetables; manufactures to give it tools, weapons, and new metals. Glass and bronze were discovered, as well as gold and silver. Writing created commerce; commerce now demanded better writing. It needed shorter, more intelligible, bills of lading. Poor work this, of having only pictures and signs of pictures to describe things, and record events, and to tell the whole story. There was so much to be remembered that while it made wonderful memories, it used up energy in merely recollecting.

Somebody, just at this point, had the grandest idea of all, about two thousand years before Jesus. His idea was an alphabet of fixed signs, to represent simple vocal sounds, and put ideas into direct speech. So a bit of bark, or a bit of parchment, could talk precisely as a man himself would talk; only addressing the eyes instead of the ears. A piece of sheepskin with letters on it could go a thousand miles, and the man could stay at home. The sheepskin could do the trading. Hurrah, for mind over matter! for mentality over materiality! for the brain over the belly! for man over all the world!

Meanwhile, the priest class, with whom all this started, had been displaced by the merchant class, and the builders, and the diggers, and the inventors; and they had sulked, and howled, and done all they could to stop this profane leaving sacred old things and ways behind—this heretical going ahead—for they were losing their influence. But progress picked them up and loaded them on, and, finally, they got used to houses and books; and then they wanted the world to stop there. They controlled, as far as possible, the books and art, and taxed industry.

Eight hundred years before Jesus, thought began to cumulate in ganglia or nuclei. Literature and art broke away from the priests. Philosophy was born in Greece and Asia Minor. Glorious day for mind! Thales, of Miletus, was the first of a grand succession of wonderful thinkers. Language was growing richer, and so men had intellectual tools to work with. We who have nearly one hundred thousand words, each one an invention and a power, can little conceive the condition of humanity when language consisted of a mere handful of rough chips. But languages grew from more to more. The story of Babel is only an Oriental way of saying that words were so multiplying that dialects had divided races.

Five hundred years before Jesus things were red hot. The beautiful rhythm of the Greek language flowed in harmony with the flute as its orators addressed the crowded populace. Socrates came, then Plato, Aristotle, Xenophon, Pericles. What an age it was, when a dot in the Ægean Sea begat a republic, philosophy, and the fine arts! In India at the same time, was born Buddha, the Prince of Peace, and soon after, Asoka, the divinest of kings. In China, Confucius appeared, and Laotze, the more radical. Everywhere in all the world mind was showing its marvelous capabilities; thought was rising to supremacy. The time had come for the human race to pass out from the mere struggle for body life altogether; it was to live a new life of intellect and morals, of hope, and love, and honor, and truth. The idea of immortal existence was already born. These thinkers resolved never to die; to so rise over the body that finally the body might go altogether, and the struggle for its existence be ended forever; but the subtle thinking mind live on. Just there, two thousand years ago, was the great dividing-line between man as the brute and man as the god : between the struggle for bodily existence and the struggle to live forever.

Did no one see it ? No one feel it ? Indeed they did. For five hundred years it was in men's blood, in their fingers, in their brains, in all that they said or did or wrote. The world was about to be made anew. Man was to meet the Eternal, to be born again of gods. The old brute-force struggle was over, but a mightier struggle was at hand. Man must now conquer himself. Brain felt overburdened. Moral life and mental life kept pace. Would not the gods help in this moral battle, as they had been used to help in the battling of armies ? The womb of humanity labored. It brought forth the victory of peace, and hope, and love. Jesus was peace. Jesus was love. Jesus was hope. This man was the embodiment of the new age. He was himself victor, as none had been so perfectly before, over the brute *within*, as well as the brute without. The struggle must now be transferred from the field of commerce, art, and physical industries, to the field of the soul. Evolution closed its first book. It opened the second. Jesus is the frontispiece of the Second Book of Life. There he is. There he will remain. No man can live in the light and the life of the nobler era of brain, of science, of philosophy, of moral truth, and not behold the face of Jesus of Nazareth as the prophet, the foreseer of the later evolution. In human evolution he occupies the peculiar position of Messiah of the age of moral life.

The marvelous richness of his life is seen in the fact that such opposite views of his teachings can be and have been developed. In his doctrines of peace the Quaker finds his authority for refusing to war, and the world believes that sooner or later the Jesus-thought will be supreme. In his doctrine of love the frail and feeble find hope, and none the less the richest character of civilization finds its ideal. Yet equally do others find in this master-mind their ritualistic autocracy and supernatural royalty. Every race, as it comes to a power to see and hear Jesus, comes to a comprehension of the enormity of war, the brutality of the struggle for selfish power and gain, and feels the destiny of humanity to pass over into an era of fellowship and helpfulness. The earlier love was a love for strife. The earlier heaven was a heaven of contest. The later love is for peace and fraternity. The later heaven has no martyrs' souls calling on God to revenge their deaths. Jesus forgave his destroyers.

To convert the world to unanimity concerning the personality of Jesus is a happy absurdity; but the world, by natural evolution, comes to a comprehension of his character. Race after race, not necessarily knowing him historically, move on to and by that point of human evolution which his life and teachings mark as the passage from the brutal to the reasonable. From him we face backward to our heredity in the animal; from him we face forward to our heredity in God.

Such was the general relation which Jesus bore to the progressive changes of the human family. We must now study some of the local incidents which enabled or compelled him to be what he was.

1. You observe that the center of the world's progress, starting in the farther East, had been steadily shifting to the westward. There was just one spot that, at that time, you might call the center of the world. Persia was to the east of it, and the wonderful products of all the old empires of the world were scattered about in the form of religions, customs, arts, industries. To the southeast was India, with Brahminism and Buddhism, the finest dreams of a spiritual sort the world had so far woven. Egypt, the gray old mother of gods and godlike deeds, lay to the southwest. Greece, just across the narrow sea to the west, swarmed over with not only Macedonian armies but with Athenian orators and philosophers. Her schools were everywhere, and her teachers. Rome, with her iron hand of law, was

already reducing the world to order. This place, this center, at the east end of the Mediterranean Sea, was Judea—the cup into which all religions, all philosophies, all human aims, all commerce, poured their contributions. Here the Rubicon must be crossed over into the empire of the soul. Here, where all ideas met, must be born the soul, in which they might sum up their tendency. Here was the natural, yes the necessary, cradle of the Prophet of Evolution. Jesus was a necessity.

2. To be a Jew was then to have the advantage over all other races. They were cosmopolitans above all people. Starting out of Central Asia by one of those propulsions, or spontaneities, of evolution, that antedate known history, they had gone down to Egypt to gather its best lore, and some of its best blood. Coming out of Egypt they had been schooled in self-government, and then were carried captives into Assyria, where they were schooled in the spiritual condition of the Zoroastrians. They were near neighbors of the Greeks, whose philosophers loved Jew pupils. But, above this, a Jew was then, as he is now, the most plastic, but least yielding, of all people. They can adapt themselves to more climates, more customs, more peoples, than any other race; but in doing so they never lose their individuality. Wisest and wittiest, as they are the most vindictive; most plastic, as they are the most stubborn; they see all, they study all, they are all—but are still Jews. Jesus was every whit a Jew; as such he was a cosmopolitan. His gospel was for the Jew first, but also for the Gentiles. No other race could produce a man capable of standing, above all ties, as the "Son of Man"; and, looking from that broad humanitarian ground, comprehend a God of all mankind. Other Jews, such as Hillel and Gamaliel, had already caught the wide thought of philanthropy, as something above and better than patriotism. Jesus had that which they had, but he had, as no one before him had, sympathy for man as man. A Greek would have tried to

argue the world into a higher life. A Hindoo would have expected the golden life only by way of meditations and fastings. A Roman would have used law to compel righteousness. The Jew, with wider sympathy, saw the power of love. Jesus, the clarified essence of the Jew-soul, began to preach "on earth peace; to all men good-will." What a grand conception! It is still the inscription on the banner of our hope: "Peace to all the world; good-will to all men."

But, whatever else the Jew is, he is always a hoper. And a man that hopes always is an upward-looker. A Jew never despairs. Jesus was the incarnation of this national tendency. No such forward-lookers and prophets as the Jews produced; no prophet so keen-visioned as Jesus; no religion so anticipative as Christianity; none that could so adapt itself to evolution, and to diversity of social environments. But note that Jesus was not a product, as is sometimes said, of Hebrew hopes. He was the result of the larger fact that humanity, having made such astounding evolution from its brute ancestry, had become possessed with a belief in unbounded future progress. It was inspired with the idea that men were children of God. That Jesus understood all the evolution behind is impossible, but he felt it. It was summed up in him. The ages of brute force were dying; the man of peace was to be born. Jesus was the incarnation of the Holy Ghost of humanity.

But most wonderful of all, yet most natural, in this passage period of about five hundred years was begotten that concentrated force of all evolution—the hope of immortality. So charged was this forward movement of mankind with the consciousness of success, of spirit power, of growing power, that for the first time man looked at his career, and said, "I will also put death under foot." All the ages behind had only spoken of the earth, and life on this globe. The Hebrew writings did not refer to the idea of immortality unless very vaguely, like a half-formed conception. No literature during all that more than one hundred thousand years of past evolution touched the idea. It had not been *thought*. But now, feeling his progress, drinking hope like wine, man became mentally intoxicated, drunk with prophecy; and he said, "We will live forever." "The last enemy to be put under foot is death"; Jesus came to bring life and immortality to light.

3. There were then among the Jews three sects—the Sadducees, the Pharisees, and the Essenes. These were rather three schools of diverse thought. The Sadducees represented Greek ideas; the Essenes Hindoo philosophy, while the Pharisees brought down the old national conceptions of life. The Essenes Jesus is not reported as having ever referred to; but the others he is said to have terribly scathed, as lacking essential truth and honesty. In fact, the Jesus party was essentially Essenic, if he was not himself a member of the sect. His cousin John, and his brother James, were certainly identified with the movement. The Essenes were characterized by their ascetic views, and deeply religious characters. Life with them was religion. All doing and all being was sacred. Eating was a religious act. They set in apposition these things: God and man; the Church and the people; heaven and earth; virginity and marriage; asceticism and indulgence. It was from this standpoint that Jesus began his work. His early baptism into these views gave the character to his teachings. The Essenes despised the shallowness of the Pharisees and the worldfulness of the Sadducees. They were the intensity of the age. Jesus rose above their forms; he did not lose their spirituality. His broad common sense ignored their ascetic seclusiveness, and looked on the world as in no way antagonistic to the kingdom of God.

The relation of Jesus to the Essenic philosophy is worthy of special note in estimating him, because it represents the great struggle of the soul to become master over the flesh; and so reverse the hitherto history of evolution. That this should have begotten ascetic alienation of body and soul is no wonder; nor is it any wonder that men plunged on for thousands of years after that in an effort to crucify the flesh without getting a glimpse of the essential organic and inherent unity of the whole being. It has been the religious mission of science in our day to establish this oneness of the whole man, and to show that the physical and psychical have one origin and one fate. The dawn of the struggle as Jesus met it was in that curious old custom, which I have heretofore described, that three thousand years earlier, in India, sent into forest life all adults past fifty, there to live in ascetic abstinence and the performance of religious ceremonies. Naturally these God-servants desired to be as godlike as possible, despising the body and worshiping the spirits in spirit and truth. Here originated fasting, self-abasement, flesh-laceration. The Essenes were the Western ascetics. Heretofore, the Hebrews had been in religion most worldly; having, as religious rewards, long life, many wives, abundance of children, with milk and honey for food, and gold, and frankincense, and jewels. Aryan thought touched the Shemites and begot the Essenes. The contest between flesh and spirit was genuine, and, although these Essenes entered the battle from a narrow apprehension of its nature, they were bravely on the side of spirit. Mind must rise vastly more supreme than it has, both within and without us. But the end was not to be the destruction of matter, as these ascetics and the monks of a later generation believed, but the subjection of the flesh to a holy purpose. No true evolutionist can be a materialist. Jesus, from a purely spiritual standpoint, became "a voice," the voice of one who believed in saving the soul. What advantage will the whole world be if you lose yourself? But how much truer was his idea of salvation than that of his pretended followers! To save the soul was not to let it be wasted, or subjected to the brute elements in us. Surely it was worth saving; it had taken ages to develop it. Do not throw it under the hoofs of animalism. But broader also than Essenism, he was no despiser of the world, or of the flesh. Only this, the soul is more than the body, as the body is more than raiment. Mixed with a good deal of supernaturalism, yet his doctrines were the healthiest expression of a spiritual sort the world had known, or, for ages thereafter, would know again.

4. A true estimate of Jesus must take into account that he was a healer. I do not mean to take you into the realm of the supernatural; not in the least. The psychical facts to which I refer are fully as natural as the simplest physical facts. It remains for our age, or some other, to reduce them to order and define their laws, as the last century has reduced physical facts to a set of sciences. Why science has been so long supposed to be alien to the psychical is hard to determine. It will not any longer consider these occult facts foreign to its field of work. Science, when fully developed, is not materialistic. Sympathy always heals. It has done more than all drugs and medicaments. It is the typical power of the age ahead, as opposed to the age behind. Jesus was a prophet of the psychic age; a possessor of vast psychic power. It was, in him, that rich subtle power of help, that charm and beauty of life, that comes to us when we meet a healthy body charged with a pure mind. The miracles told of him are mostly trashy, and doubtless false; they are insignificant juggling; but this seems clear, that his presence was sweet and health-giving. It was what yours will be in proportion to your health of soul and body. The philosophy of faith-cures is largely the power of strong wills to charge their atmospheres with a gift of life, an overflowing generosity of healthful influence. It is physical, but it is also psychical; for really what is the dividing-line between the two? But to receive health from some is a disaster. You had better be curably sick, than incurably well with grossness.

Rarely, yet at times, you are approached by one so balanced, in whom no organ of life overrules, whose spirit is also evenly and equably aggressive, so that you count it blessed to even live and breathe near him. This, I take it, is the ideal toward which civilization directs us. As we become such we shall all become healers, but at the same time shall cease to need healing. There is no other way of explaining the healing power of Jesus. But let us clearly comprehend that, as persons are, in both body and soul, in the full selfhood, clean, and pure, and healthful, they are in love with the divinely pure and good; they are one with the Supreme One, the One Life; and of that Holy One they are true and healthful phenomena. What is this but to say that That One Life, of which evolution speaks, and to which it finally carries us, is thus manifested as a Holy Spirit, a spirit of love, a spirit of healing and blessing? Jesus was that one spirit who was in sublime accord with absolute goodness. It healed, and through him it healed men.

5. Jesus was a man of the people; not a priest, nor a prince, nor a noble of any sort. His blood was fresh and virile. In horticulture, when we labor for a new advance in any fruit, we do not take the highest product of cultivation to work from; at least we rarely succeed in getting a higher evolution from that which already is remarkably developed; we go back to fresh stock and make a new start. Nature always does this. Moral power, like physical power, exhausts itself in given directions. Nations can only accomplish a certain advance. Other nations rise to build on the older civilizations. Families give us but one Shakespeare or Bacon; or rarely a succession of three or four Bayards, Adamses, or Darwins. Jesus was not the outreach of a princely stock; but grew out of the side of the great human family; a man of the people, in full sympathy with their needs. But more important is it that he did not belong to the class of professional priests or prophets. These

rarely make reformers. They instinctively defend the established; they are themselves established. All ancient religious orders had their esoteric or private doctrines, for none but the initiated. Not one of them ever had a view of humanity that could be the soul of the parable of My Neighbor. Jesus spoke all things openly, nothing in secret. Every man who could take, might take, the best truth to himself. If he only had ears he might hear. Try to appreciate the generosity of this plan. You and I live in the age when books are as common as plums and wild apples. You can not shut them up. They grow everywhere. It never occurs to you that they could be kept from the masses. Newspapers fly in the air. The *Index Expurgatorius* is the one most comical thing left in this age. But we forgot that it was not always so. The time was, then, that a book was more rare than a telescope now. To let the masses know the wise things was absurd. They were for the sacred few. They were to divine with. The priests owned them; and so, like the priests, they were sacred. Buddha, five hundred years before Jesus, spake to the poor. Some of the Jew Rabbis, like Hillel, were generous in the same way. Pre-eminently Jesus began by calling about him the common people, the poor, the outcasts. It was that that so startled the age, so outraged the priests, so offended the conceit and the profits of the privileged few. The millionaires in wit lacked nothing for gold. The corner-stone of Jesus' gospel was, "I come to heal the sick and to lift the lowly." It was the religion of humanity. A revolution that to-day should distribute all material wealth would be no more a surprise.

From the standpoint of evolution Jesus does not appear as the incarnation of God, but far more than that, as the incarnation of one hundred thousand years of man. Yes, more, as the incarnation of all life, from its dawn on the earth; of all that was past, knocking at the golden gate of a higher humanity; of that One, who, being phenomenal in all that had lived, was in Jesus phenomenal as love. Is it any wonder that this flower of evolution should have begun by preaching Turn your *minds!* for God's kingdom is at hand? The kingdom of mind was asserting rule. Turn your minds; no longer your bodies in religious prostrations. The age for crooking knees and for killing sheep before the gods was passing. The age of thought, of knowledge, as religious consecration, was coming. The progress of one hundred centuries was at last put into type; the type was printed off at Nazareth. The Word that was printed, the Logos of God, was Jesus; the Word of the past to the future; the Word of Life, of Infinite life, as it at last came to mind and voice.

The history of the world began in chaos, azoic, lifeless. That vast night of time was Christless. Then the forces of Nature changed their line of work; life began to quicken in all the earth, but it was Christless. The vegetable era unfolded its marvels, lifting the elements up to a rhythm of beauty and complex unity; and the animal moved forward till atop its vertebræ was mounted a mighty brain, and thought had a throne; but it was Christless. All things waited for redemption. Man sprang out of the complexity of forms, and fought, like all the rest, a battle for existence. But his brain began to point more to the future. It hung over his senses and dominated. He became a forward-looker. His prophetic tendency increased. His deeds corresponded. He threw down his club. He took up a pen. He looked over the world, and learned the word Neighbor. He looked upward, and he learned the word Father. God was incarnate in humanity. The brute began to die; the Christ was born. But the life of Jesus finished nothing; it only inaugurated the age of peace. The work is yet to be done. Wars must cease. Human fellowship must become a practical thought. Poverty must be brought to its minimum. "Peace on earth" must be fulfilled.

It is impossible that those who are not students of evolution, those who suppose men are failures and not a success, and that they were created but a few years ago, should comprehend the character and place of Jesus in history. He is too good for their narrow views of human nature; and must, therefore, be something out of natural sort. There is no satisfying a false view of man but by filling up the picture with gods, with judgments, with heavens and hells. So doing, Jesus ceases to be a child of humanity, a product of evolution, a necessity of nature. Lord Bacon says, "The kingdom of Nature is like the kingdom of Heaven in this, that you can enter it only by becoming as a little child." Only by a childlike spirit, coming with fresh love for facts, can you see that Jesus is the prophecy of the old era of brute force, facing henceforth toward love and truth. A deep, full sympathy with Jesus I hold to be an invaluable help to good desire. A man who fails to get the warmth of that great soul must lose the best stimulus to virtue and honor. You will lose rather than gain if you approach him as the mere makeshift of a creative failure; a patch on the torn plan of a god. Behold him rather as the Christ of human progress; the seal of a glorious past; the pledge of a future whose grandeur is still unfolding; but which, as it more speedily evolves its hopes, repeats with tenderness the name of its greatest expounder, Darwin; and with reverential love that of its supremest prophet, Jesus.

LECTURE IV.

IS THE GOLDEN RULE WORKABLE?

WHERE are we at the present day, and what is the present dynamic power of evolution? This, after all, is the most important question bearing on evolution as a working hypothesis. Is the golden rule yet a workable rule of average human life? Taking the standpoint of creationism, we are bound to answer in the affirmative, because a Divine Being promulgated the rule as a social law. Yet we find it difficult to see how, if man is a fallen being, and naturally alien to all good, he can be capable of comprehending or living up to so exact a standard. As a matter of fact, there is no such success as to warrant us in believing that it can be enforced. A religious paper just at hand says: "If anything can be done to lessen the tendency to crime, it ought to be done. And if the church can do nothing—and it seems to be doing nothing—then let us invoke the aid of some other power." In other words, not even the organized religious powers are having appreciable influence in checking the practice of doing to others precisely what we would *not* wish them to do to us.

Such is the condition of the human race that the application of the golden rule would, in many lands, lead to conflict and deeper degeneration. For what does the savage wish us to do to him? The Scandinavians of old could conceive no heaven but one, where, fighting all day, their wounds would heal at night. This ideal still survives in

German universities, where the finest fellow is the one most ready to fight a duel. The Aino's golden rule is to eat till he can swallow no more, and drink himself drunk for the sake of his gods. His ideas of life and industry are not conformable to temperance and justice. It will not do to say we will do to others as they ought to wish us to do, or as a Jesus would require; the rule is a reciprocity on the level of the reciprocal agents.

There is as yet no approximation to equilibrium in moral development. Probably each race has a predominant virtue as it has a predominant vice. Arabs will not get drunk, but they will kill. The Esquimaux will not steal, but they will lie. The Yankee will not lie, but he will manufacture lies. Thrift, as a ruling virtue, has begotten in us a tendency to place the means inferior to the end. We not only inherit the animal propensity to crowd our neighbor to the wall to secure the manger to ourselves, but we do not feel the wrong of feeding him on adulterations that involve on our part fraud, on his disease. The business-man who ever thinks how his sales are going to make or to break his neighbor is rare; unless it be to make sure that he does break him.

I open another religious journal, and read that "The natural man is an enemy of God. The gospel is unpopular with the masses." This is but an echo of all the creeds. Whatever Christianity was with its founder, it is now a religion that despairs of this world. It does not believe the golden rule can ever be applied in the present life. It sees hope only in a future world; and then only by an arbitrary and irrevocable separation of the believers from the unbelievers. So extreme is the pessimism of popular Christianity on this point that it does not, even in the next life, make its paradise depend on the golden rule, but on the absolute despair of it, namely that the saved has no righteousness of his own; he enters heaven by Jesus' righteousness. What does this amount to, but that there is only one who really can practice the rule of absolute right?

It is not Christianity only which is nihilistic; but every religion that the world has known, whatever its founder taught, has lapsed into some phase of fatalism, that involves necessary moral failure. They all declare that the Creator really intended to do a good thing in the way of making a world and its inhabitants, but somehow everything has turned out badly. His plans have been balked, and in sheer despair, or anger, he has given us over, while he allows his saints or his saviors to act as wreckers and gather in a little wreckage before the final sweeping away of the whole concern. No wonder the question has occurred to our later civilization, if life be worth the living.

And when religion is urged as the salvation and hope of mankind, we find nothing more is meant than the rescue of a moiety in some life to come.

The poetry, like the philosophy and religion of the world, has been mainly pessimistic. Spenser sings of those who,

"Crying, creep out of their mother's womb;
So wailing go back to their woful tomb."

Cowper wailingly says:

"Ask what is human life? The sage replies,
With disappointment lowering in his eyes,
A painful passage o'er a restless flood;
A vain pursuit of fugitive false good;
A scene of fancied bliss and heartfelt care;
Closing at last in darkness and despair!"

It was largely the same key to which the older poets sang. Euripides declared,

"The happiest fate of man is, not to be,
And next in bliss is he, who, soon as born,
From the vain world, and all its sorrows free,
Shall whence he came, with speediest foot return."

The all-important matter for us is not to fall under the burden of our position, and become pessimists by profession ; nor as theorists, to become so optimistic as to ignore facts. What really are the present conditions of that vast evolution of life which we have been studying ? Most certainly the progress made has been wonderful, not only during the millions of years before man, but during the era of man himself. Still, a careful and honest study of events will show us that in the high moral struggle, where the better forces of evolution work, degeneration is often stronger than regeneration. We shall not be able to act wisely without comprehending this. Human progress has been the achievement of a very few out of each generation. Consider the destruction of slavery. It may be said that an accumulating moral sentiment found expression in Garrison, Phillips, and Lincoln, yet it is clear that social conviction and religious opinion did not touch the evil with any intent to uproot it ; on the contrary, they had degenerated to the level of the maxims and interest involved in the traffic in human beings. Under the sanction of the Church and of trade lay concubinage, injustice, and the destruction of the family. Whoever in any generation has been the best expression of the golden rule has met with obloquy ; if not with the fate of Jesus, Socrates, and Lincoln.

On the whole, the saviors of the race have been those who have subjected to a greater degree physical forces to man's service. The inventor of the alphabet and the inventor of the printing-press were more highly benefactors of the race than any two moral reformers of any age ; yet it is rare that the life of a great benefactor of either class is fully opened to us without the painful revelation that our leaders, our saviors, have been far from perfect characters —often as degenerative in one direction as regenerative in another. Who can read the life of Goethe without pain that a nature so large was yet so incapable of the altruism manifested by Garibaldi or Maurice? Yet could Goethe, if less self-centered, have done the work that he did? A certain amount of selfishness is necessary to the achievement of valuable literary ends. Many must deny themselves the pleasure of philanthropy.

Probably the golden rule finds no more serious hindrance to its general application than that involved in what we sometimes term stirpiculture, or race-culture. Man has risen so high above purely physical conditions and relations that no rule of propagation can be adopted that will prevent the spawning of degenerative tendencies. When a Spartan law destroys all weak-bodied infants, it destroys a large share of better brains. Civilization so far sees no way but to go on propagating disease, deformity, and decrepitude of body and of mind. Except the elimination of lepers, and to some extent of maniacs and idiots, nothing is done as yet to regulate the generative function. If Margaret, the mother of criminals, chooses to propagate a race of paupers, thieves, and harlots, she can do it. Darwin merely suggests that the time may come when we shall be able to breed as wisely as we breed animals; but as yet society sees no solution to the problem. Love of freedom, and our inherited social instincts, stand necessarily in the way of subjecting natural selection to moral convictions. The conflict that must arise between society and the individual is not the most serious part of the difficulty. The fact is we do not know by what laws wit and morals can be always secured in conjunction with physical vigor. Any process of elimination or restriction is a beginning that has no natural end. Nor is it probable that the sexual passion could by any possibility be so restrained and reined as to secure only children of a high order. The ideal in one direction would not be ideal in another. Probably the goal is to be reached by a very long process of future evolution, involving the degeneration of races and civilizations for centuries to come.

The sexual passion, in its general violence, is an insuperable hindrance to a golden state of society. So far it has not been possible to subject it to the government of reason. Wild schemes of license and free-love have competed with slipshod legislation, but both have really accomplished nothing for the better; much for the worse. The simple fact remains that imagination is a human power, that plays into every field of thought and action, rendering passions and affections extravagant and enormous. The very same passionate power that enables us to worship at the shrine of Supreme Power enables us to bow with songs and indulgence before Bacchus and Venus. Lust and religions have been inextricably entangled. Our love rises to the ideal moral, or embraces the ideal physical.

Not only are we involved in false conceptions of sexual pleasure, and therefore in its perversion, but every one of our higher pleasures is equally under the influence of a combined physical and psychical control that involves perverted tendencies. We no longer eat as the animals do, but taste is closely akin to art. We surround the table with all settings of esthetic skill, and in every way elevate the business of eating to an intellectual level—often a moral. The Essenes, and to some extent Christians, make of it a religious rite, exceptionally associated with divine presence and love. From this we pass to the sacramental table, where the bread is the very body of God. So exalted becomes a simple act under the power of imaginative art. But this affirmative, like all others, involves a negative; so it happens that eating easily becomes gluttony and drunkenness. Every nation has some crazing decoction, connected with the most terrible degeneration; and, above all, the dethronement of reason. Thus it is that eating, the primal function of life, which can become so exalted under the influence of spiritual enthusiasm as to be our link with Supreme Life, can also by excess or perversion be the means of degrading living to a debauch of all the higher faculties.

The remedy is the one most earnest desire of civilization. It is certainly a remote future that will see even civilization self-restrained and reasonably temperate.

A third degenerative influence, that seems inextricably a part of the present stage of evolution, is our ignorance of Nature; or worse, our false conceptions of Nature. Notwithstanding the positive sciences of this age, the popular mind is excessively imbruted with the past. Our theologies are embodiments of the knowledge of the times when they took shape. In no sense whatever is Christianity supernatural; it reveals nothing. It is the astronomical and geographical and ethnological knowledge, as well as moral science, of its writers. The theology of to-day shifts its ground to no superhuman revelation, but to the heliocentric astronomy of Copernicus, and Laplace's theory of cosmic relations; to the revelations of the telescope and spectroscope. The embodiment of the past, as divinely revealed, perpetuates false views of Nature, and compels man to believe the untrue; the subnatural becomes natural and the world is kept under the foot of a cowled hierarchy, whose only claim to be teachers is their ignorance, and whose ignorance is all the worse for being willful. The world contains not less than fifty millions of priests, monks, and "medicine-men," whose chief business is to sustain notions and customs that would be quietly, by the commonsense of mankind, consigned to the keeping of history. Unfortunately this involves a false code of morals, including the sin of inquiry and the wickedness of doubt. Notwithstanding our vast accumulations of knowledge, and our escape from the murderous power of fanatical and terrorizing ignorance, the masses are still willing slaves to extra-natural assumptions. The safety of what we have achieved depends on continued and more speedy progress. Education, nominally free, is partial at the best, and ignorance is still the major premise in civilization. I do not refer to the dense illiteracy and brain-stupidity of the lower classes, but to that of the educated classes. For if even the way could, for the best thinkers, be cleared of physiological and psychological doubts, it would not take long to dispel the ignorance below. But in the realm of physical science, it is only within this century that we reached the Laplace theory of the cosmos; only in our generation that we touched the doctrines of evolution; only within one hundred years that we grappled with steam, electricity, the problems of light, heat, and magnetism. Scientists tell us our present discoveries will soon be our simplest conceptions of Nature, so vastly greater will be the inventions and discoveries ahead. The more we learn, the more aghast we stand at the problems before us. We realize first our lack of information, and equally our lack of brain-power to grasp. Evolution has created but one or two Newtons; and Newton bewailed his ignorance. Compulsory education becomes a social morality. Those who most need information least desire it. They must be educated for public safety. But here is a conflict of public safety with individual freedom. By what golden rule shall we build our common schools and universities? Certainly not to give the people what they ask for. The clearer eyes of to-day see that no one so defective and fatally mischievous system exists as our educational system. A few are feeling the way into a clearer light. The golden rule that works well enough among a troop of disciples, that reject this world and its knowledge, is inoperative in the face of the demands of a state civilization that cares only for the life that now is. To mention no other defect in our educational system, we have as yet no provision whatever for the education of the moral power; and none for the hands or physical power. The all of education is a trained brain; and seldom more than a brain stuffed. The real education of a child begins as a rule with a false cosmogony, a false origin of the world, of life, of man, of the laws of morals, and the real nature of the highest efforts of the mind in the way of hope and aspiration. The whole power of the mind to think correctly is biased and warped from infancy into a habit of incorrect reasoning and false logical processes. Not a few, indeed the majority, consider believing as moral; reasoning to the contrary immoral. The spontaneities of the brain in the presence of Nature are thus stunted by fear of that something above Nature, and that which may occur beyond Nature, and after Nature, when, having died, we are supposed to pass under moral laws of a sort wholly alien to the ethical rules of this life and this world.

A fourth tendency to degeneration consists in the general fact that our physical and social environments can not be chosen by us, and, as a rule, can not be the most favorable. We comprehend the evolutionary law that our mental, moral, and physical heredity depends on environment for rectification and progress. As a rule progress depends on our power to override environment. But without dwelling on the possibility of the Irish escaping the iron mask on their brains; or the vast mass of our laboring classes escaping the fatal grip of poverty—consider how general are such limitations as brevity of life; defective bodies; the cosmic forces that operate destructively on us; and the infinitesimal foes, equally omnipotent. We rage in vain against cyclones, and against invisible germs of fever and plague. Not one out of a thousand has a body devoid of serious weakness, either of eye, ear, or other organ. A large part of life is wasted fighting dyspepsia, or rheums; diseases of inheritance in part, in part of ignorance. Sleep or recuperation requires one third of our existence. The result is that a man who dies at fifty has probably been able to put in about five years of solid intellectual work, and no more. This is the case of a man favorably situated for study. The rest of his life has gone to sleeping, eating, sickness, and trivial cares, or worse.

Probably almost all would immediately add to this estimate of life the sad lack of leisure to do our best work; for to the second-grade work, the shop-work, even the slop-work, must most of our energies go in order to secure the means of living. Man must earn his bread first; meanwhile he sees the golden opportunities for achieving wisdom elude him forever. He must not be at his best, but his second best. How many must content themselves to be even at their third best?

Scarcely have we passed out of our crude boyhood before we rush into that period of ripeness termed second childhood—a curious likeness to the golden leafage of the year. Death waits impatiently to let us get a glimpse of what we ought to do, and might be, when it cuts short our hopes and breaks up our plans. Can a perfect state of society exist where death destroys the beautiful and lovely, and severs the sweetest union of those who, by their love, grew godlike? We speak of living three score years and ten; it is a mistake. A paper before the French Academy estimates that "A man at sixty years of age has slept 6,000 days, worked 6,000 days, eaten 2,000 days, walked 800 days, and been ill 500 days." This is a generous allowance, for the ordinary student finds himself unable to work one half that number of days.

Consider what is involved in the necessity that each generation shall begin back at childhood, and go over the same accumulation of data, also losing a vast amount of moral and intellectual power by ignorant blunders and the folly of youth. Over and over again the old road is trod, from babe to manhood. It is true heredity steadily stores up an increase of experience, so that a mere babe of to-day is born thousands of years ahead of a babe of ten thousand years ago; yet as babe he must begin. He must learn to balance himself on two feet, and rehearse the old story of getting up off four feet upon two. He must learn to lisp, prattle, talk; and the alphabet is ahead of him as truly as it was ahead of a Greek or an Egyptian. In the embryo he rehearses his animal heredity; after birth he tells over the later steps of man's progress. During these years how inevitable the blunders and the willful follies! Can there be a perfect state of humanity so long as childhood is a third of existence? What if it could be abolished? With it would also go the glory of our adult life.

> "For what would the world be
> If the children were no more?
> We should dread the desert behind us
> More than the dark before."

Whatever of harmony and loveliness exists, is one half due to the babes. We owe to their helpless needs, and the tenderness they awake, our noblest tendencies.

There is no escaping the facts imbedded in the higher society of our best civilization. De Quincy says: "Intellectually a very small part of men ever attain maturity. Nonage is their final destiny, and manhood is for them only an idea. Society is held together by baby feelings. Were it not for the admiration for wealth that is useless, for honors that are not honorable, for tinsel and show, society would give way." This might be stated thus: most people are finished in development at too early an age; finished off at ten or fifteen; and never grow any manlier or broader. It is certainly true that most people are nearly pure products of heredity. What they feel or think or do is inherited. They are automatons in social habits and in religion. Punch and Judy are hardly more so.

Once more history has demonstrated that, whatever good may come from religion, it has involved the race at all times, and under all its phases, in most bitter conflict. While we may heed history, we might still hope that we could soon outgrow those religious errors and emotions that refuse to comport to peace, were it not that we can, with careful study, observe that the fundamental nature of religion involves friction and discord. Essentially, any religion is the worship and service of an ideal. This involves a desire to secure individual favors from the object of worship, and inevitably a pious or sanctified selfishness is the consequence. "Other-worldness" has proved to be the bane of religious life. Egoistic hopes for heaven or paradise are of a nature that have led to the sacrifice of all that is dear and good. Fathers have sacrificed sons, and sons fathers, to get eternal life. The undoubted cause of a vast amount of national degeneration has been the craving to secure future rewards of the gods. Is this eradicable? It certainly is not at present, nor for a long time to come; for intolerance is a characteristic of higher minds, and the vast majority of the educated hold it just to worship a selfish God in order to escape his vengeance. In this worship of an ideal, clearly the great difficulty would be avoided if men in general could conceive a perfect ideal. But can they do this? In other words, Is it possible to have a good God? Does not religious history consist, in the main, in the dethroning of gods for better ones? All myths are full of it. The Bible is the story of the dethronement of Jehovah by Jesus, and the evolution of a God to whom human sacrifices were made, into a God of loving-kindness. Historical Christianity added the feminine element of Mary the Virgin. So it was that Theodore Parker, the liberal in creed, met the Catholic in his prayer, "Our Father which art in heaven—and our Mother too." Our devils are the gods of yesterday. Our gods are destined to become devils in the estimation of future and higher evolution.

Alliance of men and gods doubles the conflict, for when the former speak and act for the latter their piety sanctifies inhumanity. The higher the ideal the less tolerable to the believer seems the "atheism" of the skeptic. Until men can learn that their gods are their own natures projected into the infinite, their worship must involve detestation of those who refuse to worship. As a matter of fact, objects of worship have varied from serpents to the cosmic Father.

Instead of uniting us, religion essentially divides us. The contest is natural, and it can end only as we approximate a uniformity of moral and intellectual vision that, while securing peace, would be disastrous to our independent development.

Morals, equally with religion, involve us in conflict; for our moral codes involve every possible custom, and emotion, and motive. "One man," says Paul, "esteemeth one day above another; another esteemeth every day." "One believeth that he may eat all things; another eateth herbs." Early Christianity was sadly torn by this conflict of morals; and not one of the questions in dispute is yet settled. Our Sunday codes still perpetuate the one day above another obligation; and the question of eating and fastings absorbs infinitely more attention than the moral duty of knowing and being. A perfect moral code implies perfect knowledge; this, we well know, is impossible. Conscience, which we recognize as our best moral guide, is simply our inherited moral judgment. It varies in different individuals as intellection varies. When moral conviction becomes a nearly universal moral property, the conflict is by no means over; for our material interests rarely coincide with the moral. The higher morals of civilization forbid human bloodshed, but the demands of race-jealousy require that the seventeen states of Europe hold on a peace-footing armies amounting to over two and a half millions.

Meanwhile, religion complicates the conflict by denouncing morals as inferior to faith, thus weakening the power of the natural code, which has come down in our blood. But religion nevertheless makes a morality of faith quite as much as it makes a sin of skepticism and unbelief.

A fifth element of existing evolution that involves degeneration, is the necessity under which the very existence of the state is possible. I mean by this, that society as yet knows no form of government that does not involve great and persistent evils. Government is the effort of society to act as an individual; of all the social units to act as a single unit. The problem is in the first place the same as individual self-government. It involves all the difficulties that a man meets in determining and controlling his character. How large shall the collective unit be? Where shall the boundaries be established? Europe to-day is underlaid with the conflict of races. The Frank on the west, a composite race; the Saxon in the center; and the Russo-Slav on the east; all originally Aryans, but sharply removed from each other in instinctive tastes and in customs, constitute three natural antagonisms. The race-problem on the larger scale, as seen in the keen contempt and abhorrence that exists between the white, the yellow, and the black races, an unconquerable aversion, based on instinct of a not wholly valueless sort, exists in a minified degree between the different stocks of a common descent. Sooner or later the control of Europe will be essentially in the hands of a homogeneous population.

What again must become of the weaker states, the islands, the outlying territory? The history of the state has been eternal conflict. The conflict is yet bitterly sanguinary. War is, as yet, an integral part of our governmental regime. Military academies for our boys; standing armies; frequent clash of arms; terrible debts; and grinding war-taxation—that is the present status of evolution. Besides, in this corporate capacity, who shall be the head, who the viscera to do the eating, who the hands and feet to do the working, who the tongue to do the persuading?

Our social tendency we inherit from the higher animals, well developed. The individual, unsocial and egoistic, is also an inheritance of an older sort. The higher animals, and the collateral line of insects are eminently social. Individualism is centrifugal; socialism centripetal. Our feelings are centripetal; our intelligence centrifugal. So there appear in our lives two opposing tendencies. The problem is to retain our social development and add thereto a new individualism. The herding instinct, not counteracted by egoism, is degenerative, creating what we call the masses of society. All act alike, think alike, hope alike, and believe alike. Up to the sixteenth century, civilization had been of this sort. Since the culmination of revolt against the hierarchy, the individual has been of more importance. The reign of science, or independent investigation, involves a total break-up of the masses, so far as thinking, seeing, believing, are concerned. The true aim of the state must be to secure a co-operation of individuals; and no longer a willing subjection of the masses. What then shall be the scope of the state? This question involves the present threatening conflict of labor unions, tariffs, interstate relations, and "socialism." Anything like an equilibrium of peace will never be attained in this direction.

President Washington expressed his dread of the terms Northern, Western, Southern, as tending to suggest sectional interests that conflicted. We have fought over and obliterated the barrier between North and South. Yet local interests and sectional ways of looking at public issues are inevitable. Our hope is rather in bands of iron and reins of steel than in bonds of an emotional or legal sort.

This conflict underlies all association, as egoism or living for self, and altruism or living for others. The golden rule expresses the ideal adjustment of this conflict. But that it is absolutely adjustable, under even the most favorable conditions, is clearly impossible. The very law of adjustment involves a large measure of self-love, for we are to measure our treatment of others by our own desires. "Love your neighbor as you love yourself." Where the limit of just consideration of ourselves belongs, in a complex association of struggling thousands, it is difficult to determine. Not one condition of society exists where the law can be absolutely applied. The only conceivable application of the golden rule is in a state of communism, and this communism must include not only all goods, but wives and children. The attempt of the apostles in this direction was simply in the line of the golden rule. They desired to have all things in common. The end was a very positive conflict. Ananias and Sapphira represented moderate individualism. Their tragic end illustrated the murderous tyranny that inevitably is involved in any effort at absolute equality. The brutality of the equalized mob is worse than the brutality of the Dei Gratia monarch. A king may be a benefactor; a mob is *de natura* a tyrant. No-whither as yet does the world see any solution to the inevitable antagonism of interests. At present, we move unconsciously on the line of enlarging our state functions. It is probably our wisest course, provided general intelligence can be made to keep pace with our enlarged purposes.

Altruism arises, as our study of evolution has shown us, at a very early stage in life's history. It was based, however, on self-advantage in the other. The alligator would very soon shut his jaws on his friend the bird, did he not receive more benefit by sparing its life. The sexual relation is the basis of the whole structure of love and self-denial; but one sex ever sees in the other its own complementary self. Self-interest can not be by any means abstracted from the most exalted conception of the family. Love is always more or less egoistic; it is generally the most intolerably selfish of all emotions. Nothing could be more injurious than an age of self-sacrifice unless it be an age of sacrificing others. An age of inquisitions is only equaled for mischief by an age of voluntary martyrdom. Love is a complex emotion, so closely akin to passion that the gradations leave no sharp dividing-line. The adjustments from which it arises are seldom so complete as to result in the permanently beautiful and good. The ideal love ever eludes us. Our family relations cover the most destructive lusts, and the most diabolical tyranny. Life and hope, and the better objects of living, are mutely sacrificed to brute sexuality. Few comprehend any escape from this death of the soul but in celibate sacrifice of love altogether. Temperance and true chastity are hard to conceive. It is still more difficult to duly comprehend the right of others to construct a selfhood inalienable and undefiled. Thousands of babes are murdered by the fondlings and caresses of coarser natures, that for self-gratification "devour" the defenseless creatures. We know almost nothing as yet of the simpler laws of vital self-protection. Individuality, with cravings of all sorts, battles individuality, and the weaker go to the wall.

From the foundations of society have come down to us customs and views involving inequalities now almost ineradicable. Woman, early the property of man, is as yet not his equal. To grant her the ballot will not rectify a mischief that has lasted so long that it now determines the character not only of women but of men. The former does not comprehend what to desire; nor do the wisest men know what to grant. Meanwhile we burn incense to our victims, and garland them with roses; but we do not cease to sacrifice them.

We recognize that the safety of civilization depends largely on playing one debauching influence against another. It is also true of our trade and labor organizations that our safety depends on their counteracting influence on each other. Their end may be the best, yet it is a class aim instead of a general aim for public welfare. Pure philanthropy is an impossible conception to nearly all. Patriotism even outreaches the mental grasp of most. To adjust our national laws, our tariffs, and traffic, with any consideration of the welfare of French artisans, seems to most purely ludicrous. How long will it take for the discovery to be a working fact that our national welfare can never be so completely secure as when we most consider the happiness of all peoples on earth? Considering the state as an individual, each state has its own ideal which it worships for the time being. England worships constitutional democracy. Blackstone kneels and burns incense to perfection as he writes. America worships republican democracy. It is our national god, not lightly or safely to be spoken against. Each nation as a unit has thus its own economy. But slowly we are passing on to the cosmopolitan economy. All cosmopolitanism is supremely ethical. We can be national on selfish grounds; we can be cosmopolitan only on moral grounds.

Entangled with the conception of the state is the relation of capital and labor, employers and employed, as of one class to another. And the nearer society comes to that condition where capitalists and laborers shade into each other, the more troublesome the adjustment of the conflict. "The colors do not hate each other, but the shades." The slave and master could love, but not so those whose lots are nearly alike. The Cooly and the Paddy abhor each other. The social grades in a petty village are invisible, but impassable. The relation of labor to capital has never been adjusted; absolutely, it never can be.

Calvin taught that a vast decree at the outset of life settled the fate of all human beings for the next world. As religion that concerns the next world gives way to a religion that pertains to the betterment of this, the pertinent Calvinism is whether one thousand men are born to pinch and suffer, and die like cattle, while one is born to the enjoyment of enough for the whole one thousand; whether in this world, and in this life, there is a vast hell for the crowd, and a heaven for the elected few. Is this a decree of a God?

Malthusianism is the Calvinism of this life. It asserts that the necessary tendency of population is to increase faster than production can supply food. Hence, in the very structure of Nature there is a defect that requires a killing off of the superfluous crowd. Wars become a blessing. Famines are a providence. Cholera is a messenger of God to reduce and keep down the overflow of reproduction. There are men who believe this. It keeps cropping out in literature. What is the consequence? The capitalist crowds down the man with less capital; there is not enough for all; and he is right. It is the old story of the rabbit over again. A single pair would soon crowd the world with their increase, if unhindered. The banker robs the depositor as a part of the necessary struggle. The laborers must be satisfied with potatoes and beans, while the few eat quail on toast, with truffles, and drink wine; for this is Nature, and God's will. The matter grows worse and worse as civilization grows more elaborate. We give the poor free schools so that they can see and comprehend their misery; and churches, so that they can learn to be satisfied with their allotment as from the Lord. The comfortable sleep easy in the thought that they are sending the gospel to the heathen, while misery makes heathen of their neighbors.

The best we have by this theory is a world that is too poor to support us; a civilization that gives the bulk to Dives and puts Lazarus in the kennel; a religion that proposes in the next world to put Dives in the kennel and give Lazarus the good things. Jesus came to the poor; so the priest consoles the starving with the blessed fact that whom the Lord loves he chastens; if not this life, they are, if humble believers, to have the world to come. Hence arises an infernal scramble for Paradise. The elbowing takes a religious bias; for it seems that heaven is not to be big enough for all, nor God's love great enough for all. A part must be damned to give the rest ease and joy; and, with all the rest, God can not get sufficient glory with the crowd altogether saved. The many must be sacrificed to the Eternal One. Elbowing, you see, all the way from the grasshopper up to the great white throne. Millions of temples and steeples, and hundreds of millions of untaxed property, so that the few may attain eternal rest. The non-elect must pay heavier taxes so that the elect may hold the pathway to golden mansions without a price. Who shall complain? The law of Nature is a struggle for existence; the law of God a struggle for salvation. Sometimes sharks prove the fittest to survive, having the sharpest teeth. Who shall say to the potter, "Why did you not give us the sharp teeth?" Let us pray for the sharpest teeth in the next life.

What a superfluous thing is a devil! We can get on under such a system quite well without him. It makes devils of the whole of us. It teaches for this life only a hopeless struggle of overpopulation, and for the next life the same struggle repeated. Is it any wonder that business dishonesty keeps society sore at the surface, and sick at heart? that political trickery appears to be statesmanship? or that our religious teachers should sustain a creed that they no longer believe? Ward, Fish & Co. undertook to turn a penny and get a million dollars out of Wall Street lambs. The nation shuts the principals in prison for failing to do this; not seeing that success would have been the greater crime. Sewing-women are compelled to see their children grow up in the streets on garbage, and become as morally foul as the barrels are foul out of which they rake their crusts. Every day, almost every hour of every day, an unfortunate gives up the conflict and kills himself, and possibly his family—elbowed down and out. Elbows govern the system. When one writes of these things the ink is no longer ink—it is gall.

John Stuart Mill says: "If persons are helped in their worldly career by their virtues, so are they, and perhaps quite as often, by their vices; by servility and sycophantage; by hard-hearted and close-fisted selfishness; by the permitted lies and tricks of trade; by gambling speculations, and downright knavery. If one man succeeds by employing energy and talent, in something generally useful, another thrives by exercising the same qualities in outgeneraling and ruining a rival." Crime at the bottom of society is financiering at the top. Sharpness at the top is theft at the bottom. Our fundamental theory breeds vice.

Certainly, so long as society is permeated with such convictions, the golden rule is a practical impossibility—"a glittering generality"; an enthusiast's dream. By the creative hypothesis, God himself does not work by the golden rule. Practical people will not undertake to do it. Is any religion possible that will get down to the bottom and serve to the uttermost? I do not mean is there a theoretical goodness that will interfere in some future state and prevent eternal damnation, but is there a possibility of a working system that will give to every child that is born a chance to be decent, wise, and happy; or must we go on as if we believed too many souls were begotten for the possible wealth and love in the world? There is a chance for saving faith!—a faith that saves other folk as well as yourself! I believe there is a mute secret conviction that such salvation is not possible; and that is the reason we work so slowly toward ideal social relations. We must believe strongly in manhood, and in Nature, and in an honest God. It is nonsense to believe that a golden rule is worth printing until it is believed in as the approachable law of this present life. Calvinistic Malthusianism is hateful and monstrous, not because it describes a state of affairs truly desperate, but because it transfers all our faith and hope to another world. Society is infinitely the worse for its solution of our troubles. It is not the hell it creates hereafter that most troubles us, but the hell it leaves untouched here. For while the golden rule is by no means workable, it is our true measure of effort. Progress and improvement are illimitable, if ills still remain incurable.

Here, again, shape it as we may, lies a difficulty ineradicable from the nature of things. Capital being divorced from labor by machinery, there can be no remedy but to wed labor to capital by other means. So far, no scheme for this purpose is proposed but co-operation or State aid. State aid is really only co-operation on a larger scale. But here comes in the interposing obstacle that a large portion of laborers are incapable of intelligent schemes of co-operation. In other words, there is a moral and intellectual hindrance, and the conclusion may be summed up, that there is no remedy for the inequalities of society but a parallel improvement morally, by means of education, and materially by co-operation. But no one who comprehends the diversities in human power can hope for anything but an amelioration of the present difficulties. No scheme has ever yet equalized the conditions of men. The Christian plan of unrestricted charity has totally failed. The feudal system equalized downward, leaving a few lords above. The socialist schemes are hopeful and tentative, but not one has demonstrated its ability to destroy poverty. "All hand-work is also head-work." This is increasingly true. Machinery not only gives capital greater advantages; it also gives brains and tact greater advantage. By brains and tact I mean skilled brains, brains trained industrially to co-operate with hands. Skilled labor is rarely at any disadvantage with capital. Self-improvement is the road to overcome inequalities. Man is king of Nature; but some men are kings of men by nature. The only way to make kings of the rest is by increasing their efficiency. This points the road, but it does not show us the goal. The goal of human equality will never be reached; certainly not till the lion lies down peaceably with the lamb, and the lamb can make it for the lion's advantage not to eat him.

This is equally true whether we adopt the socialist idea of abolishing private property, or the individual idea of private acquisition to the utmost; whether the State be the corporate effort to act for all, or has for its aim to facilitate the power of each to act for himself. I have referred to the oscillation between these two ideas of the State. In either direction the salvation of the poor depends on participation in property; it equally depends on their skill and wisdom, foresight and brain-craft, as well as handcraft.

The socialist demands that the State, by the labor of all, shall help each to his full development. State help, he affirms, is only self-help, for the people are the State. In reality, then, the social idea involves the individual, for it aims not only at the enlargement of the functions of the State, but at the enlargement of the self-consciousness of the individual, so that he shall be able to feel himself to be a part of the social unit, the State-man. For this purpose he demands normal hours of labor, free schools, free courts, free suffrage, the abolition of standing armies, and indirect taxes. The economic condition of the laborer is not commensurate with his legitimate aspirations.

I have hardly a chance to consider that inextricable tangle which comes into our plans from cosmical laws, or from forces almost wholly beyond our control. I refer, in part, to the fact that we live subject to the operation of earthquakes, cyclones, whirlwinds, droughts, invasions of bugs and locusts, excessive heat or extraordinary cold, and electric discharges. These sweep away our accumulations, or destroy our lives in a moment. They turn the highest civilization into a desert, and laugh at us, as we at the ants under our feet. Still more uncontrollable are certain influences that direct us unperceived, and not suspected, except by some chance discovery. Such is that subtle law of migration that has borne the human race, and ideas, and civilizations, and religions, on a westward trend. Westward the star of empire surely has taken its way. No permanent and wide-spread drift has gone eastward, and probably never will. There are other laws that we do not, and perhaps can not for a long while, comprehend, such as the periodicity in evolution, to which I have previously referred; a tendency to wind up or round up movements in given periods, such as great religious revolutions, in five centuries. Commercial and industrial cycles are recognized by all classes of political economists as a fact.

Equally positive is the difficulty involved in intellectual instability. Action and thought alike are inevitably overaction, reaching as surely beyond the golden mean. While this is needful to the development of progressive human character, it nevertheless involves unrest and insecurity. The established Church and the absolute theology are never secured. No creed remains unchallenged a dozen years; it is sure to be substantially modified within fifty. Philosophies are finalities, only to be demonstrably subverted. The real value of all creeds and systems is in mental gymnastics. In a hunt for God man finds himself; in a hunt for himself he finds God. Our own age of positive science is, of all ages, most unstable in opinion. Protestantism, beginning as a protest against hierarchical assumptions, became an ally of the State against the Church. When the alliance had broken the Church, Protestantism found itself the ally of power rather than of weakness. The Catholic Church is now the home of the crowds, while Protestantism drifts toward rationalism, and gradually substitutes the school for the church. The final struggle in this direction is between authority and education, the church and the school, ritualism and reason. Catholicism does not fear the sects, it does fear the schools.

I am loath to discuss evolution, except from an optimistic standpoint; yet it is impossible to consider the condition of the lower strata in our cities without dread that the rule of iron is, after all, destined for ages yet to exclude the golden rule from a large part of our population. Prison-bars are certainly a most palpable part of civilization. The condition of our Southern negroes, and the condition equally of the whites, involved in the enforced contact of two sharply divergent races, is but an illustration of the embarrassments of higher civilization. The agricultural classes of Europe are in a condition of average stupidity that is far from hopeful. My aim is to show you that we live in a stage of evolution that involves the incomplete; that the very idea of evolution is progress toward, but the non-attainment of, the ideal; and that our whole duty is to adjust ourselves to circumstances for amelioration of existing evils. The theory of a creation requires somewhere the perfect; but, as that is not found in this life, its believers are driven to denounce the present world as a lapse, while they conceive a golden past and a golden future. We fell from holiness, we shall be taken to golden mansions of unblemished bliss. Ever the present is the evil. So the extreme of optimism is joined to the extreme of pessimism. Yet it is not possible to escape the question, What confidence can we have that a Creator who failed to carry out his plans in this life will succeed in another life, and how can you establish perfect peace out of elements so notoriously inharmonious as the saints and elect? The law of human development works from within. No power, however infinite, can work to change us from without. It is only as any being can get at and work upon our desires, that he can transform or convert us. Hence God the Father seemed palpably incomplete; and Jesus the Son; until the Holy Ghost was conceived to take his abode in the soul, and work directly on the "heart." Evolution is life itself, unfolding by its own energy; it is not a machine operated by a God. To seek your refuge in "inscrutable will," is to hide your head in the sand while your ribs are broken by destiny.

There really is no argument stronger against the theory of an Absolute Creator than the imperfection of everything. Everywhere there is incompleteness, the unfinished. The human body is not perfect in any part. It is full of weaknesses, pains, and disease; most of this is involved in its structure. How incomplete also are our adaptations! Not one of us but suffers from climate, food, and human contact. We are always dreaming ideal states that we never reach. But for these dreams life would be dreary enough. There are in us powers that we are conscious, with the best environments, would double our capacity, as well as our joy; yet we go down to the grave knowing that we are not one half that we might be. Can eternity, if it be ours, compensate? It may, indeed, rectify some evils, and transform others into propulsions, and illumine the future by contrast with the past; but for wasted powers, for a feeble, inefficient heredity, there can be no compensation. If a Creator, in infinite wisdom, having made a Shakespeare, forthwith made a Jack Cade, his work dishonors him. One half our babes are born in circumstances that involve them in wretchedness of a moral sort; and not one of us escapes an inheritance of defect. Had he his own glory in view? Certainly a race like Jesus and Milton would have done him more honor in all reasonable apprehension.

I do not intend to teach pessimism; far from it. I believe matters are growing better. But they were not a perfect adjustment at the outset. Evolution there is; but a perfect creation for that reason there could not have been. Discharged of the burden of a creative fiasco, evolution shows us life as a progressive process, with many lapses, but a steady gain. Living is not a fact, but a process of an eternal fact. Enjoyment or happiness is not a fact, but the adjustment of living to wise ends. The quality of the world is determined not by its perfectness, or its imperfectness, but by its tendencies. We are passing through an exalted era of an eternal process; as such, life is good; the eyes of evolution are in its forehead. A perfect tiger, a perfect camel, a perfect ant, would not make, or help to make, a perfect world. A perfect world is the struggle of imperfect beings toward betterment. No high ethical conditions of the universe could be reached until evolution had passed her complete tigers, her complete ants and bees, and attained an ever incomplete, but therefore ever improvable, being—higher, because less complete.

The golden rule is ever to be approximated, and a golden state of society; but never absolutely attained. True optimism is faith in the tendencies of Nature; love for life and for man; and hope for progress. Now abide, in evolution, these three things, faith, hope, and love. By their possession, man secures for himself not only physical environments of a better sort, but within himself he achieves the character of a child of God. The hopeful purposings of Henry George and William Morris, in which poetry and prose possibly confuse each other, indicate the highest and most important of all facts, that civilization has not given over great dreams—it has not sat down to self-meditation on its own perfections. Woe be to us when we become perfect! The millennium is not a resurrection of saints and an obliteration of sinners, when the world shall be converted to uniformity of doctrine, and hope shall be dead in its own fulfillment; but it is a rise to higher visions and brighter possibilities, that, illumining the inferior present, stimulate us to more rapid achievement. Evolution without beginning, is also evolution without an end.

LECTURE V.

THE EYES OF EVOLUTION IN ITS FOREHEAD.

We have so far studied the past and the present; we turn now to the future. Is it a closed book? I think not. In proportion to our accumulated knowledge of the laws of evolution, we can foresee what as yet is not fulfilled, but exists as a certainty involved in those laws. The power to prophesy belongs to all who possess facts with which to estimate. A false prophet is one who prejudges without data. Modern life is largely based in all its departments on this growing power of humanity. Political science is largely prognostication. Mercantile success depends on prevision and provision. Religion relies on known relations of vice to penal consequences, and of virtue to growth and peace, to forewarn us of what will be hereafter. Heaven and hell are tendencies, along which choice moves and moral results accrue.

To comprehend humanity, we must not only know the history of its making, but the destiny involved in its making. The men of ten thousand years ago were not, in body or in mind, the same kind of men as exist to-day; it is equally certain that the men who will exist ten thousand years hence will be still farther removed from the primitive anthropoids. The changes that have gone on have followed ascertainable laws. The bones of the skull increased in number, the area of brain surface quadrupled, the tail aborted, by laws of exact causation. Nothing happened;

nor was there an arbitrary change at any point. Following these ascertained purposes and tendencies of evolution, we shall be able to look into the future.

1. While in our physical make-up there is much that is finished structurally, and completed functionally, man is pre-eminently an incomplete piece of work. In comparison with the tiger, his bones are rough, and his muscles lack lithesomeness and beauty. Physiologically from the condylarthra, our line of descent is not high. The apes are still near the marsupials in hand and feet. Using the brain, and moving on that line, the psychical power very early began to overshadow and lead to the neglect of the physical. It is clear that the brain began to develop at the expense of the rest of the body very early in the lemuridæ, ages before there was a true anthropoid. Our physical deficiencies thus became quite marked; and permanent disabilities mark our present condition. Woman has still to get along with the abdominal muscles that belonged to our ancestors before they rose from walking on four limbs; and in child-bearing she suffers sadly from lack of muscular support appropriate to a biped. Excreting in the lower races goes on through the skin in larger degree than in higher races. The kidneys belong to the list of supplementary adjustments. Yet these adjustments are incomplete in all organic relations.

The certainty of future structural modification seems unquestionable, Development is always along plastic lines of structure; man has such plastic lines. From the phenocodus the hippus moved away in the direction of speed and size. Its organic changes were all in that direction, until it had aborted four toes out of five, and its muscles were rendered as elastic as we find them in our racers. The bird, coming out of the old saurian stock, moved off with great gain in the way of aëration, and flexible vocal cords. By its power of flight it also became a cosmopolitan, and therewith secured a brain development proportionately large. What follows? Evidently that the future modification of the horse must lie along its plastic lines of fleetness and strength; while that of the bird lies along those of music, wit, and flight. All movement is on the lines of least resistance; and evolution has thus fixed the lines of least resistance for horse and bird.

The plasticity of human development is in brain, voice, and hands; and in the increase and education of our senses. There is no chance of a better heart, or lungs, or for the most part any improvement of that large part of us that has become automatic and unconsciously operative. But how quickly the dull brain and facial lines of an Irishman leap to activity and harmony in the second generation, under the influence of freedom and social equality. The children of missionaries born in China approach in facial lines the Celestials. Our articulation changes organically according to use and climate. The hand has in it the future of man. Civilization has so far recognized only its obligation to the brain. The hands of our scholars are stupidly ignorant. The school of the future will recognize that man was the result not only of cerebral enlargement, but of liberated fore-limbs, and an articulating or language organ. Along these three plastic lines, and the ennoblement of our senses, will certainly lie man's further structural gains.

The marvelous enlargement of environments of a cosmical and microcosmical sort has brought the higher races more and more dominantly under the power of the brain. The tendency has long been for the brain to accumulate energy at the expense of the rest of the body. To despise the body has been a tenet of all controlling religions. Piety lay in belief and emotions of the brain. The doing of the hands was considered a matter of worldliness, or, at best, mere morals. The deterioration of civilized races has followed systematically; and we are just awakening to the fact that no high intellectual or moral power can be sustained without the body has well-distributed vigor and education. Probably our brain development and mental power are at, or near, their finality, with the average present bodily vigor. There must be a finer race of physical beings before the Psyche, that rests her foot on the brain, can take a higher flight.

The present evolution superinduced by man's own action tends not merely to the neglect of physical organs, but to their deterioration and ultimate destruction. The eye of civilization is not as perfect an organism as that with which wilder races scan sea and land. Civilization undoubtedly causes an average improvement up to a certain power; when degeneration sets in. This is owing to extreme demands made upon the eye under artificial and inferior lights, at hours when all organs are weary; and without provision for wisely guarding so delicate an organ. Short-sightedness is a general and growing disease of school-children. The more cultured races are characterized by the necessary use of spectacles. Humboldt tells us that when traveling in the Andes, his party was necessarily divided to examine opposite spurs of the mountain-range. As he approached the point where the two parties should converge, he could discover no signs of his friends, and expressed to the guides his fear that they were lost. The guides looked at him with surprise, and pointing across the valley said, "There they are." Humboldt still could see nothing but trees and rocks. However, taking his field-glass, and following the direction of his guides, he was able to distinguish the party on the opposite slope. He made sure of the reality of this extraordinary visual power, by causing the Indians to detail his friends' motions, while he observed them with his field-glass.

The sense of smell has been largely modified, and in some directions its power destroyed. I need not recount the story of the Australian who, on all fours, tracks his foe by the sense of smell like a dog. His alert, open nose catches scents that wholly escape us. Civilization of even a low type begins the compressing of the nostrils, and changing the organ to an intellectual feature. The Grecian or Roman nose indicates less alertness, less range of nature, and is more an indicator of reflection and introversion. Noses obey not merely sensations, but respond to the highest perceptions and hopes. Meanwhile, we can doubtless detect refined and delicate odors that the Australian can not. He lives by his nose; we enjoy by our noses.

The actual destruction of an organ, or a functional power, is very improbable in a highly organized creature. Nature is more likely to readjust and readapt an organ to a new range of power. In the heads of certain lizards are found the vestiges of an eye that was in use millions of years ago, but the demands of life required a better eye in a different position. The old eye was allowed to shrink into a vestige, the orifice of vision was closed, and the whole affair apparently forgotten. Not quite however, for anatomy now reveals to us this nerveless organ of vision, and helps us, by means of it, to see the distant past.

So far Nature, in its struggle to adjust us to the universe about us, has given us five distinct methods of sensation, and therewith organs of a specific sort. Life existed on our planet for over two hundred millions of years before there was a head at all. Sensation, however, existed all along the line. There was the equivalent of our five senses in a diffused sense power. But it took all those millions of years to concentrate and difference sensation into senses; to collect the senses into headquarters; to get light and sound into a hole; and nerves pushed up to the front, to take the reports that came in. But the first eye was clear inside the head, and existed only as a ganglion of seeing nerves. Touch still remains as a general and only partially specialized sense.

Sir William Thompson suggests that we are acquiring a new function of sensation, which he terms the electric.

Is it possible to develop a new sense organ? or a composite sense? Is what we call our psychical life leading us to a new and subtle relation to the universe, at present crudely known as mind-reading, telepathy, hypnotism? Certainly we have come into the electric age, and our needs are also new. We are dealing with, and subjecting a force, which is correlated to light and heat. For light we have a delicate sense-organ; for heat we are also equipped; but for electricity we are not. Or we think we are not; yet we are conscious of some close relation between electricity and magnetism and our psychical powers. One of the keenest writers on scientific topics says: "A sense enabling us to perceive electricity would frequently disclose a scene as varied as a gorgeous sunset. Every movement of the body, every touch of the hand, and the very friction of our clothes, would cause a play of effects analogous to those of light and shadow to the eye. By direct perception we become aware of the vast importance of light, little of which could we comprehend without eyes; and it is probably owing to the absence of direct perception that we do not yet know the part which electricity plays in the economy of nature." Electricity is fundamentally associated with all things—animals, plants, crystals; yet it is a mystery, because we can not perceive it. Something will yet come out of this chaos. Recognizing the fact that there is a world of sensation below the organic senses, involving even the vegetable kingdom, why shall we hasten to deny the possibility of a state of sensational existence higher than we have yet reached? However, the adjustment of the senses we now possess to their maximum intensity and breadth would open the universe to us as a wholly new realm, and marked evolution in that direction would be equivalent to a new sense; while the effect on us, morally and intellectually, would be revolutionary. We have only to bear in mind that our sense organs are as yet imperfect, and wholly incomplete.

The education of the brain at the expense of the rest of the body is telling in other directions; notably in rendering us toothless and hairless. The coarser secretions are impaired by intensity of cerebral action. This is not wholly a recent tendency. The incisor teeth of the Neolithic man were not chisel-shaped, like ours, but presented a flat surface. This was the result of living for the most part on roots and grains, which he ground as animals masticate grasses. His jaws also set square one upon another. Over six thousand years ago the Egyptians ate in like manner. The older race of cave-dwellers was carnivorous and tusked. The Neolithic man wore his teeth off to the roots, without decay. We lose ours before middle life. Science shows us that energy, when used in developing hair and wool, is so much deducted from brain-power. Animals that are furnished heat by domestic care, change not only habits, but voice; and their intelligence increases. But the excessive use of the brain, on the contrary, especially during the years of physical growth, tends to decrease the hair and destroy the teeth. Primitive men were clothed, like their neighbors, the bears, with comfortable fur, and they were proportionately less sensitive. They endured cold that would kill our civilized races. It is palpably a law of Nature that any readjustment that gives to one function increased power does so at the expense of other functional power. Education, under civilization, has enlarged the brain power fourfold, and in like ratio refined the features; leaving the care of the body to conscious wit, instead of the unconscious resources of hair. The brain must now clothe the body.

Our babes are born with the protruding abdomen and the flat noses indicative of the primitive anthropoid. This is part of their heredity of an animal sort, not got rid of in the pre-natal embryonic condition. Before birth they pass through the hairy stage, when the jaws protrude and the forehead recedes, and the four limbs are alike in functional relation. The arms of lower races are longer than those of civilized races; their legs thinner; in this there is less departure from the quadrupedal condition. Savage races never outgrow the protuberant bellies of our infancy. They constitute vast pouches for holding an enormous storage of food. Such people must gorge when they can, so as to endure hunger when they must. One writer says: "I have seen a four-year old Yakut eat three candles, several pounds of frozen butter, and a large piece of yellow soap. I have seen adults eat forty pounds of meat in a day." So evolution leaves us at different stages of development. Nothing is more certain than that civilization, enlarging the brain, has abolished forever the power and need of devouring gross food, and in enormous quantities. Our jaws narrow as our foreheads widen. The condylarthra group from which we descend had more teeth. Two incisors, two premolars, and one molar on each side have been lost. Prof. Cope figures the coming man of higher races as distinguished by twelve teeth in either jaw, or twenty-four in all. Our food must hereafter partake of the refining influences of culture.

Mr. Darwin quietly suggests that the laws applicable to the structural improvement of animals are equally applicable to the improvement of human stock. Man, he says, scans with scrupulous care the character and pedigree of his horses, and cattle, and dogs, before he mates them, but when he comes to his own marriage he rarely considers the result on progeny. Whatever may be hoped for in this direction in the future of evolution, we must remember that the development of human beings is highly complicated by this law that modifies the whole structure to accomplish the exaltation of a single organ. The brain must not be allowed to destroy the vital organism.

Any marked increase in the relative size of the brain can hardly be looked for or desired above that which has already been acquired by the higher races. Brain-growth increased, as we know, from the first appearance of the mammals, five million years ago; and to this has doubtless been due, all along, a very large share of correlative structural change. In the Lower Tertiary brains were minute. In the Upper Tertiary the Pliocene brain is larger than the Miocene. A structural ennoblement of lines of evolution, as in the horse or antelope, or ape families, has been coincident with ennoblement of the thinking powers. But the encroachment of the brain on the energies of the body seems at last in man to have reached the maximum, consistent with evolution of any sort, if not with the very existence of any organism. The future of human culture will doubtless involve a hygienic improvement, which, while it brings the working power of the brain to its maximum, will give it no more relative power. The possibility of replacement of organs, so general in lower life, is lost. The earth-worm renews his head in three days, but if man loses a limb it is a permanent loss; while a diseased limb may become a permanent burden. Our necessities for nerve-repair are all exhausting. Higher civilization threatens to involve a permanent loss of power to sleep and recuperate.

The present question is, how much our nerves will endure, how much widening of intellectual environment. The Cingalese lives in his bungalow, cracking parasites for his neighbor, and eating what Nature spontaneously offers him, contented. Bring him into the whirl of European life and you will kill him. The astronomer, on the other hand, has widened the sweep of his vision to embrace the cosmos. I ask him, Does the increasing outreach deaden his imagination, and no longer startle his nerves? or, Does terror overwhelm him as he finds his feet on a star that sweeps in a cycle so vast that the figures that measure it are meaningless? What is the limit of mental elasticity? Are we approaching a point where the brain only counts, and no longer fears, feels, fancies; or where, dizzied, it must turn back, creep under the blue of its own world, or perish? This is no idle question. Is the brain practically unlimited in its power of adjustment to environment?

2. We leave the question of future probable structural evolution to consider the probabilities concerning intellectual growth. Is the world likely to gain in intellectual capacity? Has it, on the whole, gained for the past two thousand years? There is nothing to warrant the supposition that mental power in England to-day is superior to that of Athens in the days of Thales or Pericles. The subtlety of wit and philosophy, from the data then at command, was equal to that of the highest modern schools. For careful research and broad generalization Aristotle is the equal of Darwin. We have produced no finer moral development than that of Buddha, Jesus, the Antonines, and the Rabbis of the century preceding our era. It is without question that the poems of Homer have never since been equaled in magnificence and cosmopolitan power. For any one man who has stamped the world with his genius, and directed all the thinking and hoping of later generations, we must turn far back to that supreme master who stands on the dim verge of historic days, whom we call Zarathustra, or Zoroaster, or Brahm, or Abram. He is the literal father of all nations that to-day comprise the world's civilization. It is not likely that events and ages will so converge their power as ever again to give us a Jesus, with such magnificent forerunners as Socrates, Buddha, Plato, Hillel, and Confucius.

This, however, is what can be said of later days: that rapidly—very rapidly of late—intelligence is becoming an equalized property of the whole race. The average intelligence of this century surpasses by far the average of any past age. When Buddha and Jesus declared that the Gospel of Salvation was for the poor, they ushered the dawn of the world's greatest social revolution. Knowledge, for ages the private property of priests, was at that moment made public property. The tendency has gone on, until now no one thing is so free as the air, unless it be education. While we can not anticipate any large increase of brain power for the future, science, applied to education, will no doubt produce an average of intellectual power that will obliterate, first, barbarism, and then superstition, and finally vice.

Modern common sense, which is only another word for common intelligence, includes specifically a vast gain in the way of rapid and varied concentration of attention. This power is almost wholly lacking among savage races, except in the direct pursuit of sensual gratification and personal safety. So far it is purely an animal power, shared with the ox, the dog, and the horse. The result is that, if compelled to face a rush of facts that appeal to his critical judgment, the savage is killed outright. Civilizing is a method of destroying lower races. To convert them to the abstract religions of progress is to send them speedily out of the world.

To generalize facts into abstract truths is also a remarkably growing capacity of the average man. The possibility of the long survival of notions that have no warrant under the laws of causality is passing away. Many African tribes are said to be unable to grasp the ideas of light, color, tone, or sex. They see only a color, a sun, a man, a woman, a sound. But the school-boys of Aryan races are born logicians. The superstitions of religious fancy are lifting from the world like a morning fog.

Suspension of judgment is another faculty that is steadily becoming the common property of mankind. It is a growing power, under civilization, to hold the mind in hand, to restrain it by ascertained laws. There is in popular government, and in the contingent wide discussion of great and perplexing questions, an educative power that is inestimable. Along the line of popular government, with a free press and a free platform, human progress will be accelerated; but, at the same time, a balancing of authorities and a judgment held in suspense, while waiting on facts, will be secured.

But probably the highest differentiation of brain power is the peculiarly late achievement of foresight. A specially human faculty since the primitive man built his first hut, and tamed his first dog, it has grown amazingly with the culture of civilization. Of the Brazilian Indian, Mr. Bate says, "He thinks, I believe, of nothing except the matters that immediately concern his daily material wants." Of African tribes, another says, "Their minds can not escape the circle of sense, nor will they occupy themselves with anything beyond the present." How magnificent is the contrast presented by the foresight imbedded in our schools, our commerce, and our cities!

These points indicate the lines on which is moving the evolution of human average intelligence. And there is no reason for doubting that, in all these ways, the future will hasten development in geometrical ratio. Yet there has been, and doubtless will be, a degree of compensative loss. The memory of earlier races was proportionately more tenacious than ours. Without books, their only method of retaining folk-lore and the tales of the poets was by memorizing them. In India, to-day, if you wish to determine the correct text of a Sanskrit verse, you assemble the pundits, and each one, with astonishing ease, will repeat to you a volume of his sacred literature. It remains for you to determine which rendering is sustained by the highest authority. Higher civilization, however, makes such diverse demands upon us that it is forced to furnish us an artificial memory. The pencil, pen, and paper constitute the modern memory. A skillful use of memoranda more than doubles a man's mental endurance and executive power.

Music also, as pure melody, belongs superlatively to the lower races. Music of the higher races has passed into an artistic expression of emotional ideas. The brain has dominated all vocalization as well as all sensation.

3. I pass, thirdly, to consider if we are evolving, and likely to evolve, in the direction of higher morals. I do not believe that our moral convictions, as expressed in the highest lives and best maxims, surpass the golden rule, or the nobler altruism of the best souls of earlier ages. Yet, as in the gain of popular intelligence, still more we can demonstrate the vast enlargement of general morality. No such average strength of temperance, justice, kindness, toleration, and human fellowship ever existed before. And it is certain that the drift points toward a humane and benevolent unfolding of social and individual character that will hereafter class even our higher civilization as crude, if not brutal. While absolute peace would be undesirable, even if possible, an approximate social equilibrium seems both desirable and possible; a state in which human energy shall not be wasted on friction which is friction only, without compensative results.

While we have perhaps no higher conception of moral doing than the golden rule, it is clear that we are giving it a constantly higher interpretation. Even the sun is changed in color by the medium through which it shines. The last reduction of this rule would be in this form: act for the best evolution of yourself, and also of your neighbor. It is neither a superfluous nor an impious question, whether we have not outgrown the supreme religious test that we should live for the glory of a God. Modern interrogation insists on knowing why a Being who was infinitely glorious should have created men to glorify him; and it seems to be a very much higher law of right that we should do right because right-doing ennobles us, and is the basis of human progress. Science urges also that of all the great discoveries and inventions on which civilization and human happiness depend, not one is the revelation of a God, nor is one specially conducive to the glory of a God. The press, the telegraph, the railroad and steam-engine, reapers and sewing-machines —not to mention, of early days, the alphabet and the cereals, and fire—all these we owe to human ingenuity. Before these man was a groveling savage, worshiping gods, but honoring none. The moral progress of man is illustrated by the fact that the original drama can not now get a hearing, while Shakespeare is expurgated for the modern stage; nor dare a Christian minister read from a pulpit parts of his divine book.

There really is no comparison to be made between the England of to-day and that of Clarendon's time, or even the days of the Georges. Fox and Sheridan could not hold prominent positions in England as it is; they would be driven by public sentiment into decency or darkness. Gladstone is no more than a fair exponent of average moral sentiment of English civilization. This is true over the whole civilized world, and when enormous vices come to light we have the consolation that they must be dug for; whereas, two hundred years ago, they were in kings' courts and cardinals' palaces. The very concourse that made up the retinue of bishops and archbishops that went up to Councils to settle Christian theology, included harlots and clowns. We may justly argue from what is, what is to be; and optimism justly foresees a vastly grander era of self-control and human rectitude.

It would have been sad, indeed, if people could not have outgrown their moral standards and their gods. There is no firm basis for morals under the theory of a creation. Why should the created be more just than the Creator? The moral perplexity is insuperable that rests wholly for ideas of rightness on an arbitrary will, whose sole motive in creating is self-glory. Evolution is hurrying us rapidly by constructive morals of all sorts. The higher civilization becomes fearless of an honest use of days and a free exercise of reason. Social duties are also rapidly being readjusted. The ordinary schedule of charity is seen to be a relic of false social and religious notions, whether expressed in Peter-pence or in soup-houses. It is an effort to render endurable what should be eradicated.

It needs no power of optimism in the blood to encourage us to foresee that war and drunkenness will follow the steps of slavery, that only yesterday, standing on human rights, to-day makes a distant echo in the past. We need such a hope to make our blows strong. The upward-looker, seeing great things, achieves the destiny of hope. It will not do us harm if we see greater than we can embrace. Let us imagine the irresponsible Creator dethroned in men's minds, and the idea of absolute justice established as the supreme ideal—the dream is already being fulfilled in actual social evolution. The accumulation of moral force is a necessity so long as the world grows in knowledge. Conscience is peculiarly a product of evolution. There seems to be no good reason to doubt that the present ideals of life will be the future reals. The theological heaven no longer wins attention because it is not comparable in virtue and comfort with phases of life already realized on the earth. There is nothing valuable in the way of happier social and political conditions, which is not potentially achieved when it is imaged. Progress is a prototype and an antitype ; a dream and a life ; it is in the hope as truly as in the act.

4. Probably in no direction is humanity anticipating the future with more anxiety than in its social evolution. We are now in our higher civilization inaugurating a change of social forms, and an exchange of controlling influences, fully equal to that from feudalism to centralism ; and from centralism to democracy. The control which for three centuries has been concentrating in the hands of middle classes is now passing into the hands of differentiated educated masses. Giving the gospel to the poor was a dream that was realized only in giving them free schools. They now have the ballot, and are taking the reins. What is to be the result of the sum of tendencies that we call socialistic is the anxious inquiry that will soon be solved. It is impossible for a highly moral nature to withhold sympathy from those who work in the belief that society can be so

ameliorated that there shall be a cessation of wars, an end of standing armies, and an equalization of the products of industry, that shall essentially banish poverty and its vices. Yet we must remember that in all social forecasts there are, and ever must be, two elements to be considered. Heredity is ineradicable; only modifiable. There is an intense persistency in customs, institutions, and tastes. There is also an elasticity in human nature, as in all nature, that produces incessant readjustment. It will be impossible to secure an ideal state, as it is impossible to secure an ideal house, or an ideal state of art. The restless ideal eludes, and is ever ahead. The perfect is not attained; but progress is.

To a casual view social forms, above all things, seem permanent. Many can not endure the thought that our institutions can be, and society must be, readjusted. But, as an historic fact, not anything is less stable than the relations, and forms of relations, which men bear to each other in the social groups. A state of perfection would be a state of automatism. Imagine us as nests of human ants; a race of automatons with human faculties. We breed, we war, we eat, we accumulate, we build, we trade, without a modification from century to century. Heredity absolutely triumphs; the radicals are all dead. There are no more theories, no more experiments, no more revolutions. A genius would upset things; he would be instantly killed. The ideal state of society aimed at by those who killed Socrates, Jesus, and Savonarola, would be accomplished. Only to the list of moral martyrs must be added the Edisons, the Bells, the Whitneys—all inventors and schemers. Such seems to be essentially the desire of those philosophers and those theologians who describe the millennial reign of a God. Energy will have run down from active consciousness into absolute instinct; and men will have become one more hive of bees, or cote of doves.

Whatever may be the social changes in the future, we know, however, that we shall move along certain lines of evolution that have operated since the anthropoid became man. The family will undoubtedly remain the permanent unit of society. It was the first of all social aggregations. Individuals are incapable of forming co-operative association of a complex and lasting sort. The relation of sex, leading to that firm compact that is cemented by love of offspring and mutual obligation, became the corner-stone for such multiples as the tribe, the nation, and humanity. He who undertakes to build without the family will build on theory and not on history. The future must stand on the past. Man is not one, but "they twain are one." This is literally true. The unit of nature is duplex. Add to this that history has accumulated its experience to testify that monogamy for life is, on the whole, the safest and most useful form of marriage.

The social reformer has this advantage, that the evils which he wars with are not essential parts of evolution, but are barnacles on institutions. Malthusianism and Calvinism have no life of their own; they live on, and draw their life out of, Christianity and Aryanism. The divorce between capitalist and laborer is not incurable or essential. The structural possibility of man depended, as we have seen, in the main, on securing a regnant brain, and free fore limbs or hands. Society is now based on two classes: those who live by the brains and those who live by the hands. Education belongs to and concerns itself only with the former class; ultimately it will become the training equally of the brain and the hands; and the two parties, the manualists and the capitalists, will be merged in one, and the worst of social difficulties vanish. This revolution in educative methods will be very speedy. "All revolutions," said Napoleon, "begin in the belly." So do all reforms. The question is whether you can bring the brain to co-operate, and direct the revolution.

"The first thing is to teach men their misery." Free schools have done this. Freedom alone is no longer satisfactory ; it is worthless without a share in the world's material prosperity. Half freedom seizes whole freedom. The last of immoralities is that any poor man, educated to know right, shall submit to wrong. To settle his line of resistance is the problem. Shall he tear down a hell only to build a selfish heaven ? Socialism however, with all its crudeness, indicates the outlook of this age to a better, more equitable state of society. The reign of magnates, made millionaires by the mechanical inventions of the times, will be brief.

The road that will lead to a better social state may not be so determinable. Possibly a new enthusiasm, such as the fifth century before Jesus witnessed through Buddha, Confucius, and Socrates, or that summing up of all human inspirations in Jesus himself—possibly some such great elevation of human life and purpose may occur again, by the action of natural evolutionary laws. Possibly we may not be far from a vast psychical evolution that will place us in relations to beings of a finer sort, as helpful as they are wiser. Possibly the path may be wholly along the way of law and education, the ballot and the state. There are not lacking reasons for believing that all these influences will be combined.

The problem now is how shall families live with comfort, and enjoy the advantages of culture, on an average of two hundred and fifty or three hundred dollars a year. At present it can not be done for less that three times that sum. As a consequence, there is not only hunger and suffering of the body, but that pinching of the soul, and self-denial of intellectual food which is hardest of all things to endure. Relief may come: 1. By lowering the cost of necessaries. Science has already undertaken to solve the problem of cheap transportation. The idea of the state is widening, so that it is no longer chimerical to expect to see fuel, light, and water as free at least as education now is.

Our postal system is the ideal; whereby a great burden is so distributed that every man has that privilege, which he could not secure by himself alone at one hundred times the cost. Postal facilities are virtually free. It is the most magnificent achievement of civilization. It is not too optimistic to anticipate a vastly wider application of the idea of the state; when other property, or even persons, shall receive carriage at rates as nearly free as your postage. 2. There may be a simplifying of the demands of living, or rather a direction of the drift of daily living to higher ends. The vestiges of barbaric desire in us—the animal love of parade—will wear out. A large part of our daily household toil is wasted on utterly worthless and superfluous machinery. Living consists of non-compensative waste, dusting and polishing what does not contribute in the least degree to our selfhood and character. Evolution will, without doubt, carry us forward to a capacity for coöperative action, and to a wiser judgment and a compensative taste.

What consequences will follow the emancipation or elevation of women? So long as any class has a wrong to ventilate, society will be well shaken with the effort. That the health of society depends on agitation is clear to all students of history. We may not be gainers therefore, in one direction, by putting an end to the conflict. Woman is now educating herself to undertake the vastly wider range of duties which will soon devolve on her. This question, however, is no local affair, but as an evolutionary problem concerns the rescue of woman the world over, from the position inherited from primitive society, or even farther back. Our earliest ancestors owned above all their women and their gods, long before they owned cattle and land. The emancipation of woman from man, and of God from priestcraft, are coincident necessities. That all human beings shall be able to love their neighbors as they love themselves is impossible, until they are able to some reasonable extent to love themselves. A slave can not love himself practically. There is much in the relation of woman to man that indicates a very general inability on her part to establish a character of exalted self-appreciation. She is still in the social and marital market. A woman that is property can not be a partner. A state can not be compacted on inequalities and injustice. The sexual relation begat the social. Before Nature evolved the two, there could be no fellowship. Man was not created first, and then the woman ; but both are differentiations out of a commonalty in which the feminine preponderated. Man came off with more strength of limb, woman retains most tenacity. Nature loves best the woman. The female among quadrupeds and insects is least liable to disease and early death. Man has most intellectual aggressiveness, woman most moral judgment. One thousand men commit suicide to two hundred women. Drunkenness, and the diseases depending on self-abuse, in average society, preponderate as the property of males. In lower races the male is shorter lived. Civilization, affording an approximate equality of condition, gives also an approximate length of life. Probably the future evolution of the race will find no more influential factor than woman allowed a free exercise of her functions. We can form no just estimate of this question by considering it as a petty affair of the ballot, or a local agitation. It is the ennoblement of one half the human family.

The social evolution of the future will pre-eminently be cosmopolitan. The national idea is flowing into the broader idea of internationalism. We are steadily fusing our national interests by means of commerce and literature. It began with the industries, it will end with a unity of political life. No state can stand alien from others without a state church, as well as a state government—a creed as well as a constitution. Goethe prophesied an international literature. Goethe himself is now read in Japan and in India, as well as in all Western languages. All the world reads Shakespeare ; all men love Longfellow.

5. It is customary to group a large class of phenomena that concern man, or emanate from his personality, as psychical. Palpably they are not wholly separable from the physical. It is not improbable that the special work of science for the next fifty years will be to classify and reduce such phenomena to laws, precisely as the preceding century has reduced to comprehensible order the bulk of physical phenomena. The glory of man is that while reaching out to a knowledge of the cosmos, and enlarging his environments to the stars and universes, he has, at the same time, adjusted his emotional life to a universal spiritual population, whether they be a reality, or creatures of his own imagination. You could narrow and dwarf him no more by cutting off his relation to the physical cosmos, than by secluding him forever from all but terrestrial spiritual associations. In this vast realm we constitute but a meager minority, but our position grows in importance when our world is considered as the source of a steady tide that flows outward into wider relations.

The relations of mind to matter, or of sentient purpose to physical environment, are not near a finality. The fact is, organic conditions are groove conditions necessitating that we shall exercise sensation, and therefore acquire knowledge only under limitations. The possibility of surmounting these limitations, and, while holding the particular powers, regain general power, is not wholly chimerical. There is no reason for supposing our wills may not ultimately control our unconscious functioning — even the waste and repair, disease and decay. The effect of glacier ages was revolutionary on the anthropoid man. The development of vegetable foods under the rise of agriculture, caused again a transition period. Apache tribes that live on flesh only are shriveled ; those clans that use a mixed diet are tall, muscular, and healthy. Quite as great evolutions and revolutions are ahead. The laws of food-use we are just beginning to get at. Science has only begun its work.

On our world time and space are fast being annihilated. Miracles have leaped out of science. We whisper around the globe. Scientists speak of what is done as that which will soon appear as child's play. We have seen enough in the birth of the telegraph and telephone to prevent skepticism concerning future greater discoveries. Thought surpasses time. Our conceptions of space are revolutionized. We stand now looking out at the other worlds, weighing and measuring them. Are we to be balked of all closer intimacy? Only the other day Galileo gave us the telescope. Fifty years ago the spectroscope opened another revelation. All worlds are thus found to be of the same material; iron, gold, silver, oxygen, carbon—it is all familiar. Is that all? Have we no neighbors there — no brothers? Science has no sneer for those who wish to inquire of other matters. If now we could enter into psychical relations with the other worlds, we should have reached a home at last; and the thought, Our Father who art in the heavens, would at last have leaped forth from the mouths of children who felt no fear of the vast, and no dread of the future.

Our lives are largely made up of a vast number of chaotic facts included under the heads telepathy, love, attraction, repulsion, sympathy. The limits of sympathetic and telepathic power are yet to be determined. Mind transference, mediumship, clairvoyance, and faith-healing, all have to do with this general fact that the psyche is not bounded by the body, but acts beyond it, and possibly apart from it. It is the fact that the realm of spirit is so little comprehended that makes it the abode of lies, frauds, miracles, inspirations. Religion must yet be reduced to education, and education enlarged into a full development of all our faculties.

6. Evolution has also under contract vast industrial progress. It is difficult to foresee what greater things may occur in the way of invention and discovery, but of late we have gone so fast in the direction of placing mind supreme over matter that we are able to feel a confidence in the future that one hundred years ago would have brought into doubt our sanity.

The evolution of the historic races began with the taming of animals, and the artificial production of foods. But for the rose family, the palm, and the cereals, together with the horse, camel, and reindeer, the anthropoid could never have emerged from the savage condition. Our future evolution will also be largely decided by the creation of higher fruits and vegetables, and the subjection of forces that displace the beasts of burden. Agriculture has always been the great creative art. The tilling races have conquered the earth. The plow was mightier than the sword before the pen traced a letter. It is no less powerful today. No farmer feels that he has well done unless he has created a new potato, pear, wheat, strawberry, or, at least, so improved an older stock, vegetable or animal, that his name may be perpetuated with the pedigree of progress. What names rank higher than Downing, Van Mons, Kirtland, Barry, Goodrich? The effect of a new wheat that would produce one hundred bushels to the average acre would be revolutionary.

Probably among the mechanical appliances sure to be soon introduced none will be of more general value than malleable glass. As a building material, it will supersede all others for sanitary and ornamental purposes. Then for the first time will it be possible to have floors and walls in which shall lurk no germs of disease. Thorough sanitation will be the great social aim of the future; to hunt out, and bar out, those tricky foes of ours that are the source of nearly all diseases.

The metal of the future is as confidently predicted to be aluminium, the base of all clays. The world contains a thousand times as much aluminium as iron, and already methods for its cheaper reduction are devised. Its strength surpasses iron or steel, while it is almost uncorrodable. Gases, acids, and water do not tarnish it; nor does heat change its color. It is the best known conductor of heat, also of electricity. It is extremely ductile, and worked with great ease, while it is lighter than some of our harder woods. In the words of one of the leading scientists: "It is the lightest, easiest worked, strongest, most durable, and generally most valuable of all metals; and the man who invents a method of making it cheaply will revolutionize industry." It is not easy to imagine the universal and sweeping influence of the introduction of two such new materials into our industrial economy.

We are already entering the electric age. Its use in the production of heat and light is a certainty assured. As our forests fail—and our coal-beds compel us to forecast their exhaustion, electricity pledges that, at a trifling cost, it will warm every man on the globe, and light the humblest cottages. Its use is eminently social and co-operative in tendency, but in running machinery independently it will correct the undue tendency to agglomeration in vast cities. So easy will it be to distribute its power that smaller factories, and more of them, seem destined to supplant the vast establishments where capital so easily becomes omnipotent. Whatever tends to break up cities and distribute population will be a social benefactor. At present the increase of civilization is nearly matched by the increase of misery in our large towns. But not only will the use of electricity render the poor man less dependent, it will tend to emancipate capital from dependence on wage-service. Such changes, while unable to equalize human conditions, which would be undesirable, would tend to an amelioration satisfactory to all who desire to enjoy the toil of healthy progress.

To generate electricity directly from coal is the secret that must soon be wrested from Nature. Scientists promise that within fifty years coal will not be carried from the mines to our yards, but its heat-energy only be transported. That is, coal will be converted into heat, heat into motion, and motion into electricity. The electricity will then be converted back into heat, or motion, or light, when and where it is needed. To generate electricity in this manner would dispense with boilers and steam-engines ; would make power one tenth of its present cost, and enable every human being to own his private carriage without expense of keeping a horse. Then must follow an enormous industrial evolution in the way of heating houses, cooking, moving boats, carriages, and running machinery. I voice the thought of every housekeeper that the age that shall largely do away with the need of "help" will smooth the way of life immensely.

But there is no single hindrance to the rapid evolution of humanity more inflexible than defective forms of speech, meager vocabularies, and a multitude of languages and dialects. The future progress of mankind must lie, as did the past, along the line of improved vehicles of thought. The English language is a magnificent product spoken by a hundred millions of people. The Chinese is used by twice as many, but is primitive and inflexible. To the adaptability of the English we owe a large share of our power ; to the arrested development of the Chinese language that people owes largely its arrested civilization. There is no doubt but that the present tendency to agglomerate human languages into a few, more fluent and flexible and wealthy, will go on until in speech the human family is united. We may with reason foresee the crowning race

"Of those who, eye to eye, shall look
  On knowledge, under whose command
  Is earth, and earth's, and in their hand
Is Nature, like an open book.

"No longer half akin to brute;
For all we thought, and loved with deed,
And hoped, and suffered, is but seed
Of what, in them, is flower and fruit."

Among all these problems of forecast the most strange fact is that man shall have spent so much time consoling death, with dreams of a second and deathless life, and done so little to abolish death itself. Before nothing else has he sat down and said it is invincible. The early Christian philosophy unquestionably looked for an early victory over dying. "The last enemy that should be placed under foot was death." The power of the grave was supposed to be literally broken. The religion of evolution is peculiarly the religion of an endless process of living. It hates disease and degeneration; and, abhorring the cause, abhors also the consequence. It will never prefer to busy itself with consoling the dying, but devote itself to the amelioration of the condition of the living. Health is becoming a question of morals. Ancient sanitation the priests allowed to degenerate into petty baptisms and sprinklings, while they made saintship of filth and physical neglect. Evolution sweeps clean these religious stables. The freshest ideas of our age, and those fullest of progress, are born of health-seeking. Full soul-life and full body-life go together. The greatest crime against the soul is the degradation of the body. No law of Nature clips the thread of existence at threescore years and ten. Vital statistics show that among the higher races the average life of males has increased five per cent in thirty years, and the average life of females has advanced eight per cent. The average of human life has nearly doubled within two hundred years. The causes that have operated so far to increase our years are still operative, and are multiplying their power. The grosser races are falling under the influence of sanitary laws. The most subtle and sweeping causes of disease are hunted out, and being rapidly put under control. Man's will increases its domination. Man's inventions minify his dangers and discomforts. Centenarians are more frequently to be met with. The question has even been raised whether we may not be able to so control environments as to live forever. Certain it is that at present our vitality is for the most part wasted. The result of a more profound knowledge of physical and psychical laws it is certain will induce us to live far more wisely than we do. There seems to be no reason for doubting that the average of life can again be doubled. If once, why not twice? If twice, who shall say that is the end? We must never forget that this is not a mere question of matter against matter, but of mind against matter. The facts of past evolution point toward higher persistence of individual life, rather than toward decay. That we shall reach an average of one hundred years before the year 2000 is by no means improbable. Those who believe that Methuselah reached nearly a thousand years can have no reason for sneering at the hope for one hundred. Our sanitation is yet in its infancy. The road out of savagery is a passage into longer life; a steady gain in average length of life up to a maximum. That maximum is where civilization begins to exhaust itself by high pressure, by luxurious living, and by overwaste of energy. Our energy as Americans is another phrase for rapid waste. The problem for us is such a conservation of energy as will allow the longest sustained effort of a high quality.

In the consideration of this question, of course we are met by the Malthusian assertion that the world will be overpopulated; and food be an impossibility. There must come the intervention of blessed catastrophes to keep down the increase of population, or there will be a rapid running down of life energies, a quick degeneration and oblivion. Maudsley, the ablest English pessimist, declares that the slow climbing to the heights of civilization will be followed by a speedy plunge into degeneracy, and a collapse of evolution. The down-hill passage will be immensely more rapid than the up-hill has been. Meanwhile, if we are to believe these men, the race has reached nearly its acme of possible evolution.

It is not difficult to answer that precisely such a prophecy might have been made at any point of the two hundred and fifty or three hundred millions of years of life-lifting. Equally might it have been made at any point of human progress. The earth for the cave-dweller could sustain not over a million of people; but for the hunting-races the possibility was certainly five times greater. The advance to shepherd-life, and the general domestication of animals, gave the earth probably one hundred millions. But agriculture has already increased the population to fifteen hundred millions; and that number can easily be doubled without reaching any limit of present resources. But this is not to count on any further improvement in the methods of securing food. Is agriculture the last possible stage of production? Our foods are, for the most part, natural reductions of nutrient elements to vegetative processes. It is the work of the chemistry and physics of Nature to take the elements first contained in air and rock, and render them into life-sustaining compounds. Chemistry and physics are becoming the subject agents of man. Are we certain that they will not enable us in due time to create food directly from the same elements out of which they now create it indirectly? All that earth-culture does is to enable Nature, by a slow process, to transform nitrogen, hydrogen, carbon, and other elements, into edible products; in other words, to enable us to eat the rocks. Higher agriculture hastens the process. Is it chimerical to suppose that the slow process of natural transformation will ere long be supplanted by an artificial method, as speedy as it is essential? During past evolution the increase of population, from stage to stage, has been tallied by an increase of abundance and quality of food. Prognostication of a failure in the future of this law of parallel evolution is superfluous.

As to absolute overpopulation, consider the fixed tendency of nature. As races increase in brain power, their energy is drawn off from propagation of the species. The higher families of culture illustrate this law most forcibly. Old races are obliterated by a lack of fecundity. The Huns are now the only race in Europe in which the births barely overbalance the deaths, under ordinary peaceful conditions; and the Huns are a fragment of the Turanian stock that has never shown the power to carry on severe mental application without more serious physical exhaustion than the Aryans. The evolution of the future may therefore safely be said to involve less increase of numbers, and an increase of individual persistency. It is not difficult to conceive a single generation enduring for a vast period, without perceptible increase or decrease. This can be secured certainly only by a further reduction of destroying agencies, and by a method of life that enables the repair of the system to closely balance the waste. But beyond this there is involved the necessity of a largely increased evolution of psychic control of the material body.

Equally true is it that evolution has been a process of sacrificing all other ends and aims to quality. On my lawns, side by side, stand a thorn apple and a Northern Spy. In May, these blossom with equal profusion and beauty. But in October you will see that the thorn, which is not a child of late evolution, has one apple for every blossom; one small, insignificant, and valueless fruit; while the Spy has flung aside nine tenths of its possible fruits for the sake of one magnificent ball of fire, filled with the genius of culture and the inspiration of progress; it is quantity sacrificed to quality. This is a law of Nature that covers all evolution, and will guide the development of the future. The toiler's cottage has three young heads thrust out of every window; the home of genius and culture has but one or two to the whole house.

But it will not be possible for the scholar of evolution to overlook the fact that in all the past history of life there has been a steady dropping of conscious will and thought into a storage of unconscious automatic action. So that to-day a very large part of intelligent action is instinct, or pure automatism. The vegetable world retains purpose with barely a semblance of consciousness. All unconscious purpose in Nature is accountable for as conscious will passed over into mechanical energy, retaining directness of aim. Are we on the road? Already a vast preponderance of our intelligent action has lost its consciousness. Are we ultimately altogether to become, what we now are in large part, automatically instinctive? Those who have read the previous lectures, will more fully comprehend the question. The problem recurs for fuller discussion hereafter. It is enough now to say that this is precisely what those pray for who ask for final rest, and an end of all the friction of conscious care and pain. Their heaven is a vast exhibition of moral machines. Herbert Spencer also foresees the time when men will act morally, not through a determinative choice, but instinctively. Richter suggests that a very large degree of our finer loves are already instinctive. We are born to love life, as a woman is born to love babes; it is no longer a matter of choice. Our intelligent accumulation of force in any given direction tends to fix our choice in that direction as an automatic inheritance. The power of habit is the tendency toward automatic repetition. National life passes in the same direction. Egyptian art from plasticity became hardened, inflexible, unconscious. Greek art took a fixed form. Chinese life, once versatile, and full of conscious freedom, became supremely mechanical. Most of our virtues consist in doing what our fathers did. Choice in morals is shocking to the majority. Is there then a finality toward which Nature carries all conscious existence, and all self-conscious, ending inevitably in automatic instinct? Are we but ants unfinished? The problem is not avoidable. To delay this lapse of conscious energy into unconscious energy, Nature struggles ceaselessly. She crosses stocks, and supplies the momentum of new environments. Our danger is not from new adaptations, but from falling into instinctive religion, instinctive loving, instinctive living, instinctive methods of thinking and acting.

Can the permutation, produced by crossing races, continue forever to rescue national energy from dropping down into formalism? As internationalism brings about a more rapid and easy fusion of races, it also hastens us toward the limit of new crosses. Is cosmopolitanism therefore the end? It will be only a larger nationalism, as a larger nationalism is an enlarged individualism. The end is completion; and completion precedes extinction. Animals are now with great rapidity becoming extinct. The insect families only hold their own. The vegetable kingdom swings once more slowly toward preponderant power. We move inevitably with the animal kingdom. Will the geology of some vast future gather our remains as we gather the bones of the megatherium?

So you see it becomes an all-absorbing race question, not a mere question of individual immortality, whether man has not at some point of his evolutionary career reached a point of union with the Universal Divine Life; whether his ethical and rational development, depending on what we crudely call inspiration, does not involve also his vital and physical evolution. Man's real grandeur and his strength seem to be that he has, by the force of evolution, become psychically identified with an essential and infinite life—toward which he looks as Father. The question is not wholly what Nature would do with us, since man already vetoes much that she undertakes to do.

Evolution has to do with a fact larger than man, even with life itself. Having in the course of evolution reached man, we must not forget that he is of interest mainly as a phenomenon of that Infinite One that we were compelled to consider before man was. The evolution of man is properly conceived only as the finest manifestation of that life, in which he lives, moves, and has his being. Morals from this point consist in sustaining and enlarging vitality; immorality is self-destruction. Salvation is not a mechanical scheme of pardon, but a practical obedience to life-laws, that render our existence more complete, more sure, and more enduring, as well as more beautiful. Life eternal is to know the eternal life; to be conscious of, and intelligently faithful to, the life that would in us work out the problem of love and truth; and write over all the records in our brains the golden rule.

LECTURE VI.

ETHICS THE AIM OF EVOLUTION.

AFTER all, the most prominent feature of human life is its quality of right and wrong. Man is an ethical being, with choice open between two ways. His evolution or his degeneration lie before him as matters within his own purposing power. Is ethical purpose purely a human attribute, or does it run through all nature? Is it an attainment that marks the summit of evolution, or is there an ethical purpose running through all the development of life from its origin?

All views of morals apart from evolution, whether of the utilitarian sort, or the transcendent reason of Kant, look from a theoretic standpoint. Man has in conscience a divine guide; yet practically the human family consists of different races, with wholly different conceptions of right and wrong; and with ideals, called gods, as absolutely opposed in character as love and hate, forgiveness and revenge—the Prince of Peace, and the God of War. The Apache, says General Crook, does not understand you. His conception of morals demands the acts that you condemn. His social and religious position, for time and eternity, depend on revenge and bloody retaliation. He has never evolved beyond the eye-for-eye stage of moral perception. There is no readier confutation of the supposition of a divinely-revealed code, or an inherited apprehension of morals, than the evolution of the God of the

Hebrew scriptures from the Jehovah of the Old Testament to the Divine Love of the New; or the evolution of the conception of right from the covenant with Abraham and the robbery of the Canaanites to the golden rule.

The field is, however, in the main, held by those who believe that moral law, if not our moral judgment, originates in the will of a Creator. Right depends on obedience to laws established by this Supreme Person, and by him either printed in man's conscience, or revealed in what are known as his scriptures. Cardinal Newman, one of the most careful expounders of orthodoxy, gives us the following authoritative view: "Behind the veil of the visible universe, there is an invisible, intelligent being, acting on and through it, as and where he will. This invisible agent is in no sense a soul of the world, after the analogy of human nature, but, on the contrary, is absolutely distinct from the world as being its creator, upholder, governor, and sovereign lord. I mean one who is sovereign over his own will and actions; though always according to the eternal rule of right and wrong, which is himself. On rational beings he has imprinted the moral law, and given them power to obey it, imposing on them the duty of worship and service; searching and scanning them through and through with his omniscient eye, and putting before them a present trial and a judgment to come. The laws of the universe, the principles of truth, the qualities and virtues, all that exists is from him. Not indeed the incidental sin, overabundant as it is, but the great outlines and issues of human affairs are from his dispositions." I should be glad to give you the whole of this superb and daring affirmation, of not only a creator of things, but a creator of morals. This view of morals not only makes right and wrong wholly depend on the fiat of a supernatural being, but it wholly fails to show why he is not himself, by that fiat, accountable for evil. It makes, also, at one stroke, prayer to be a puerile absurdity, and reduces religion to an effort to induce an absolute being to modify his eternal and unchangeable determinations. Deriving our only conceptions of right from him, we find our most pious exertion in endeavoring to persuade the author of goodness to conform to our conceptions of right.

Or if, on the contrary, this supreme, extra-natural being be not innately right himself, according to our highest standard of right, if he contravenes our simplest conceptions of justice, then to pray to him becomes an appeal to what, to us, is wrong by the very standard he has given us. We must morally adhere, not to the absolute standard by which he governs his own actions, but to the standard he has revealed to us to guide ours. How can a man to whom murder is a crime *per se* address a being who can slay at will? How can a man of the nineteenth century supplicate and worship the being who directed the war of Israel against Amalek?

As an historical fact has God, or has any god, ever had a moral attribute not derived from his worshipers? The very word implies as much. Instead of his revealing a code to us, have we not created a code for him? and do we not expect him to abide by and enforce it? Our prayers consist largely of reminders to Deity from our standard of morals, on the supposition that right with us must be right with him.

Theoretically, God can do as he chooses; his will is moral law.

"Let bears and lions growl and fight,
For God hath made them so.

"I thank the goodness and the grace
Which on MY birth hath smiled;
And made me in this Christian land,
A free and happy child."

Here the child is taught complicity with a purpose that leaves the bulk of children in moral darkness, because itself, without other reason than the mere will of the Maker, is excepted from the ruin. On the other hand, we impose certain limits to that absolute will, and demand a hearing.

I do not know any franker statement concerning the morals of authority, than that given by Frances Power Cobbe, in her able essay entitled "Magnanimous Atheism." You can justly sum up her argument as follows: 1. It is unsafe to build society and character on natural facts and truths. 2. There is really no basis in Nature for high morals. 3. The result of the commonly-accepted theology, although it may not be true, has, nevertheless, been a state of exalted morality. This is certainly a defense of *suppressio veri*, and a good deal more than that by implication.

The contest with extra-natural morals must, however, be made just at this point. No just discussion of history will allow that the tendency of supernaturalism has been to exalt character. Every enormity has fortified itself in society by the supposed will of God. It is quite too fresh in our minds that this "will," revealed in the only book of "Divine authority," was the bulwark of slavery, until machinery, and the morals evolved by agitation, assailed and destroyed the institution. Equally unpleasant is it to remember the historical conflict of science with revelation; of reason with faith; the alliance of the Church, *Dei gratia*, with tyrants, also *Dei gratia*; the suppression of public opinion and private conviction in the name of God, and by methods wholly satanical. Neither can we forget that morals have been made to culminate in a debauch of fastings, penance, prayer, and a hard-scrabble for eternal glory; in which the "struggle for existence" has kindled *autos da fe*, and been infinitely more brutal than that of tigers, and more false than that of reptiles. The tendency has also been ever to elevate to power those who have decried mere morals, denounced reason, and claimed to be God-appointed expounders of that which can only be known through their interpretation. In fine, an extra-natural God, revealing a supernatural code of morals, involves a hyper-natural Church.

Against the whole of this assumption and presumption, evolution sets itself with demonstration and emphasis. It not only discards the idea of a Creator *ex natura*, but shows that the ethics of life are an integral part of Nature itself. The study of lower forms of life reveals to us the evident germs of moral apperception, as well as intelligence. In some animals the idea of right is considerably developed. The tendency of life has always been toward an escape from the reign of brute force. The key to the position, thus assumed by evolution, is a denial of the supposed fall of man, and his need of a revelation supplemental to the revelation awarded to intelligence by the universe itself. The history of life is, according to evolution, on the whole a wise and steady meliorism, a growing drift toward the nobler in character, as well as in structure. If this be true, then morals are the unfolding of Nature to the apprehension of our inner senses.

We are brought of necessity to a biological study of morals. Is there in lower life a potency, and germinal unfolding of moral purpose, that will serve as a sufficient basis for all that is evolved in human life? Is it any more difficult to pass over to the animal world, and find moral fellowship, than to pass from higher civilization to barbarism, without an absolute break in moral and ethical sympathy? In my previous lectures I have so fully discussed the moral sentiment among animals that I shall not feel bound here to largely go over the ground.

I have been exceedingly interested as a horticulturist and student of Nature in observing the recognition of the rights of property in domestic animals. A hen will not concede a grain of corn as belonging to another, but the one robbed will manifest indignation; but a hen will recognize the right of another to the occupancy of a nest, if not thereby seriously discomforted. A cat makes no claim to possession until her foot is on the piece of meat. After possession, however, she asserts positive rights, and heavier cats will generally allow the claim. Old cats will often allow young ones to rob them, but they will not permit older ones to do the same. A dog not only claims a bone while in possession, but establishes his right to the same bone when buried; and woe be to the dog that opens his *cache!* This recognition of property rights is seen everywhere in lower life, although theft is common. Again, if you find your horse in his neighbor's stall, eating oats, and scold him for it, his retreat is made with marks of shame. This is doubly true of a dog taken in a fault. I have seen the same manifestation in a fowl. The idea of rights comes, of course, before the conception of abstract right. Natural rights are recognized by every creature that exists. The birds recognize not only their own rights and family rights, but the rights of their neighbors. A thieving outlaw is held to be a common enemy, to be chased and destroyed by the co-operation of all honest birds.

Man inherits this germinal and growing consciousness. His first word for right is "rita"; that is, straightness. His moral idea is also a physical idea. One of the most overwhelming facts is the lack of moral cognition of a high sort in the bulk of the human race. Even in higher civilization we find a vast blankness of moral apprehension. Our own civilization brings to the front quickness of apprehending the application of physical forces to material progress, but leaves the moral sense of neighborliness much nearer the animal stage of evolution.

The advance in size of brain, and quality of brain-texture, is not by any means determinate of moral power. Shakespeare, in the place of the supposable Adam, might, and doubtless would, have been simply a vast brute. It has been no slight effort on the part of evolution to bring out those relations of self to self, and to others, that constitute the ethical life. Involved in progress has been so much of degeneration, that it not infrequently allows the brutes to put us to shame. The breach between animals and man is really far from being so wide as we sometimes imagine. If we draw the contrast between Gladstone and the beast in our stalls, there is an undoubted and magnificent reach of power gained by man over the animal. But the bulk of men to-day are of a very different sort.

M. Ferry, in a recent study of the moral sentiment in the criminal classes of Italy, found all, with one exception, worshipers of "God," and devout religionists. All were devoted to prayer, and believers in divine answers. They invariably sought aid of this sort in their enterprises; and brigandage was elevated to a moral endeavor. Some of them expiated their crimes, as they believed, by dipping their fingers in their victims' blood, and, after the sign of the cross, sucking and swallowing the blood.

Our heredity comes to us not directly from the animal life, but through an ancestry of savages, where instinct lapses in its struggle to become reason; and we get neither the pure instinct of the brute, nor the well-considered judgment of a man. The babe bursts into life in a cloud of passions, and displays feelings in the crude state of transition from animal to man. In the embryonic state he is compelled to rehearse all past stages of moral development, as well as physical evolution.

That which in us is heredity is largely instinct; and most of our emotions are only instinct. The steady tendency in man is to lift these instincts into the sphere of conscious reasoning. A vast number of sensations that in an animal lead only to responsive acts without moral choice, pass in man under the review of reason, that is of higher experience and comparison; and so awake in him either self-restraint or evil indulgence. Sin is unreasoned reason, ending in desires short of self-government. Vice is a hybrid of reason and passion; animal passion alone is incapable of vice. What in man is sin, in the animal is not.

The use of reason is simply the application of interrogation to the larger multiplication of data at our command. Besides we bear certain relations to the universe, and more complex relations to each other, that animals do not.

Primitive man inherited the accumulated experience of vast ages of preceding life. None of it was lost. He rehearsed it structurally in the embryo, and morally he repeated it in his own career. But he added little experience of his own. When he evolved language, he possessed a growing power to increase his knowledge, to store it, and compare its bearings. These comparative experiences soon dropped into moral codes like the ten commandments. There were no other laws but moral laws; all action had a moral significance. Such codes were organic in influence; framing society and determining governmental development. Such codes sublimate in the golden rule. But the simplest of these codes are still far ahead of the masses of men. Darwin suggests that the murder of infants has prevailed, or now prevails, without reproach over most of the world. The scalp is the moral glory of the Indian. The Old Testament, as read in our churches, is full of the foray spirit; and the Psalms are rarely ethical in spirit. In rural England, the greeting is likely to be, "Who goes there, Tom?" "A stranger, Bill." "'Eave 'arf a brick at 'im." Neither a decalogue nor a golden rule can enforce itself. They become comprehensible only as a people, by commerce, widens its relations and its vision.

Human history is in the main a struggle of man to comprehend himself and his neighbor. His battles, his traffic, his discoveries, and his inventions, have tended on the whole to widen moral vision. Even war marks an advanced stage of society, both in the insect and in man. It is in the main a conflict of organizing ideas. Homer's "Iliad" was born of war. The Esquimaux have no wars. The stone-age man was incapable of anything so organic. He never went beyond brute struggles and conflicts. That nearly all wars have involved some sort of right, and in the main religion ; that more blood has been shed for the gods than for any other cause, only shows that man had not, and even yet has not, a full comprehension of temperance and justice ; that is, of himself and his neighbor.

An act is right or wrong purely from the standpoint of national or individual evolution. The Buddhist from the standpoint of transmigration of souls, and the affinity of all spirit, whether in men or beasts, has an instinctive code more refined than that of Christianity. His reverence for all life is at the maximum of moral vigor, but not of intellectual comprehension. The golden rule, as a law girding every human soul under the sun, was not an axiom of an innate conscience, nor a revelation flashing into all souls ; it is the latest demonstration in the geometry of moral measurement. It is the growing power to widen our sympathies ; that is, to see as others see, and feel as others feel ; the power of evolution, bringing us at last to the law to do the greatest good to the greatest number.

What is good ? It is that complex conviction which grows up in the mind that exercises itself in feeling with all parties, as identified with all. I am humanity. God and man become one. Repentance is no more nor less than a victory of nobler motives and larger sympathies over narrower ; the result of the universal application of the law of temperance and justice.

There arises at last an evolution of power, based on widening knowledge, to enter into sympathy with abstract man ; man abstracted from lower desires—a being embodying the enlightened ideal. And it so comes about that through sympathy with, and reverence for this ideal, there is established a love for the absolute moral will, a desire to conform thereto, and remorse over a failure. This is piety, whether you call your ideal God or Father. It is purely a stage of evolution.

Therefore piety involves no uniformity of convictions, nor a uniform code of morals. Unfortunately, with almost all men cessation of evolution is mistaken for piety; ritual takes the place of reason; and conformity to an external law is substituted for the law of growth. There is, however, no possible road to loving God with all the heart, but that of widening sympathy with our neighbor.

While most degraded tribes of human beings are literally fallen beings, there are others who seem to present to us simply a lack of development. They are links of moral life just above the animal. These are not the brutal races, but those innocent and comparatively harmless races of the hills of Japan and India. Other races were arrested in their development at the stage of the river-drift men. Darwin was struck with the similarity of the tools and food of the Terra del Fuegians and those of the cave-dwellers. So we have in development, arrested at different points, quite a history of moral and intellectual progress. The moral history of the Aryan race is in like manner preserved in the development that reaches from the Cornish miner to Queen Victoria. Change the environments for the better, and in two generations, or three, the brutish becomes the cultured.

Here we get, constantly repeated, the power of wider and more varied and generous environments to rapidly create moral conditions of a higher sort. Religion outwardly is our relation to, and explanation of Nature; it is our conception of the forces about us, not ourselves. Religion inwardly is our obligation to such powers, including ourselves; and our aspiration toward the ideal individual. Our creeds are always sharply defined by our science; and were equally so ten thousand years ago. Early religion, being at once science, philosophy, and worship, was so absorbing that from the earlier ages we get little that was not classed as religion. They give us no direct facts, but facts purely in their religious bearing. History was told altogether as a religious process, a programme of gods and men, therefore nothing lies worse than ancient history. It was told truthfully from their standpoint, but from our standpoint such books as the Pentateuch and Vedas are romances. What was written was emotion, hope, fear, love, honor, hate; and facts were constructed to suit their passions and notions. Pets of gods lived to be a thousand years old, and the highest moral ideal was to serve the national god, that life might be prolonged and prosperous.

We thus pass to and fro across a disputed territory, between man and animals, and find that there is really no sharp dividing line, as there certainly should be, if morals depend on a code of divine origin. Moral purpose is rooted precisely where all other evolved tendencies are in the desire and effort to exist, and to better the conditions of existence. For at no stage of evolution has life been a mere struggle to exist without improvement. Morality in man may be summed up in temperance and justice. Temperance, covering duty to one's own being, is a form of self-government. Man ought to be temperate, because life is measured by temperance. Intemperance is self-waste. All morals under this head are purely physiological, underlying fullness of existence. They coincide with the great struggle to exist. They constitute a factor of the struggle. Temperance equally with courage sustains life. Under the head of justice are included such morals as honesty, truthfulness, equity. These look less to our dealings with ourselves, and more to our dealings with others. Both are, in general terms, animal traits; as they are only in general terms traits of human beings.

Justice and temperance in animals find their first strong propulsion in the care of offspring. Apart from insects, however, and below the vertebrates, they do not appear as they appear in higher life. In some cases spiders are devoured by their own offspring, whether a willing sacrifice is doubtful. But the ant will cheerfully devote its life to the children of the family. Parents, as a rule, in lower forms of life do not long survive the act of reproduction. That which is perishes for and into that which is to be. The individual is little thought of. Higher up the race is less considered and the individual more. Comtism is the religion of the monera, not of men; of life in the flux, not life as aggregated and concreted in Milton. It makes a race of Falstaffs more worshipful than a single Shakespeare. The predominant idea of civilization is, on the contrary, the perfection and preservation of the individual. Generation yields to regeneration. Temperance, or self-preservation, becomes the chief of virtues. As the individual establishes its value, life grows inestimable. That which before was the function of a whole nest, or tribe, is now the function of a single person. This is unquestionably the basis of human selfishness; the care of the ego, the acquisition of property and power for individual use. The reproductive power even falls into abeyance. But no less at this point is the basis of the higher ethics of humanity. Temperance finds its complement in justice. These two rise together: "I say unto you, love your neighbor as you love yourself." The care of self rises into the care of other self. Moral character is constituted of two functions, self-preservation and preservation of the non-self. Care of self is summed up in temperance; care of our neighbor in justice.

It is, therefore, incorrect to call the struggle which goes on in all life below ours a struggle for existence. Very largely it is nothing of the sort, but it includes a vast sacrifice of self for the general good. It is rather the lack of self-valuation that characterizes it. Think of the magnificent tenderness, consideration, parental anxiety, that characterize the bird-life in your orchard for a single season!

On the other hand, the highest altruism and the most exalted piety in man never lose sight of self-advantage. It is our interest to obey the higher laws. The decalogue and the beatitudes alike appeal to self-interest. At first the appeal is to secure longer life; afterward to secure higher life, or eternal life. It is never anything apart from existence that we seek ; and the morality lies in the quality of the existence. It needs no demonstration to show that we have here only the struggle for existence lifted, exalted, clarified ; that which the amœba displayed is that which also re-appears in the saint and Saviour. Jesus assures himself a resurrection in all humanity by sacrificing a few years of his earthly career.

Nothing was more apparent in the study of structural evolution, than that we are constituted of an animal inheritance, superadding a greater complexity of cerebrum, a finer reticulated nerve-system ; more adaptable limbs ; and yet doing nearly all that we do by the half-blind instinct or wholly blind reflex action of life from below us. It is equally apparent that our best morals, involving our worship, are only a vast inheritance from behind, with more or less addition of higher sentiment, based on a wider conception of causes, and a more general knowledge of effects. The survival of every form of primitive morals and religion is also apparent. In our churches are fetishes of all sorts, bones, books, customs, amulets, prayers to be rotated, the sacrifice of a Saviour repeated in pantomime, and our sins borne off by a substitute. There is constantly a two-fold tendency ; decalogues and beatitudes, inherently plastic, and capable of higher spiritualization, lead forward ; creeds and rituals in general lacking plasticity, and incapable of evolution, tend, on the contrary, to check growth, and disturb the orderliness of moral development. Yet in the end they are the cause of those vast leaps of moral evolution that we term reformations.

Do we, therefore, allow for no innate truths, no voice of conscience, no direct sense of right in human nature ? Certainly for nothing of the sort which is not a fruit of evolution, originating in animal life, and receiving propulsions as the race advances ; dropping constantly into heredity, but a heredity of conscience ; forever a moving factor, not wholly yet largely automatic. Evolution recognizes in morals no fixed code, but an ought, that shifts with increasing light and knowledge. By what means does it come about that a lie is determined to be immoral? A lie unquestionably often tends to self-preservation, and even to public welfare. Are we dependent on outside law to determine the evil nature of a falsehood, while evolution is wholly regardless of the moral quality of untruth? Not at all. Experience has created an ethical conviction that truth and truth-telling are of such exalted importance that the liar invariably involves himself in degeneration. "Deceiving and being deceived" go always together. Experience shows that a step into falsehood is a step into darkness; and the conviction is absolute that the value of truth is unpriceable. So that which in the physical sphere is universal, deceit and misrepresentation, in the ethical sphere is supremely wrong. Martineau, although insisting on the sense of right as an innate power, allows that three fourths of our moral code is development from experience. We affirm that the whole code is the natural unfolding of lower life terms into the terms of a more complex life under the light of increasing knowledge. So the maternal tie of the insect expands into the magnificent florescence of human motherhood; that sweetest, holiest, most eternal, and unfathomable of affections. So the friendship, which in previous lectures was found based on utility between birds and fishes, or even birds and reptiles, is developed into that exquisite unity of a truly moral marriage, or that golden poem sung in "John Anderson, my Jo"; while regard for the more powerful, which brings the dog to our side, rises into the ecstasy of holy love for the Supreme Good. Those who are inclined to doubt the possibility of the natural evolution of all moral convictions, yield the ground by allowing the rise of any moral convictions in the course of development. We must also consider that the development of intelligence and morals made a more wonderful progress from the monera up to the dog, elephant, and ape, than from the beginning of human life up to the present time. Draw across the chart of evolution a line to indicate the first development of a nerve; another where the sexual relation appears; another where an ant dies for the children of the nest; or an elephant guards a human babe; or a dog gives his food to a helpless friend; and you must concede that if supernatural assistance were needed anywhere it was at some such point, and not to guide Penelope, or Cato, or John Howard. The inspiration that led St. Paul to say, "I will neither eat meat nor drink wine, if it cause my neighbor to offend," fills all nature, and is received by all beings in accordance to their capacity and desire.

And yet, in spite of this general truth of natural moral evolution, we can make nothing coherent of ethical development unless we allow for inspirations. By this I do not mean that Nature has needed the interruption and assistance of an outside moral power as a corrective or stimulant, but that Nature itself acts upon our moral heredity at points with overwhelming force. These inspirational points may coincide with the birth of some moral genius like Zarathustra, Abraham, or Buddha; or with great inventions such as language, letters, and printing. In a previous lecture I traced a marked periodicity in which natural evolution is involved, producing completed cycles of moral unfolding.

But this very power of an inspirational sort is also an inheritance. Recognition of the *alter*, and the rights of others, must have had many quickenings before man was reached. The differentiation of sex left one sex incomplete in joy without the other. Again, what a tremendous stride in the unification of the interest of mother and child when the mammals began to bear their babes in their wombs till functionally complete! Was this anything less than a moral inspiration? Or when the ape began to use clubs and stones, and thus to identify himself with physical nature in the way of supplementing his hands with tools—in fact, became germinally a tool-maker! Such inspirational points must necessarily have multiplied in that great border-land from animal to human, when the anthropoid was no longer quite beast, and yet was not quite man.

The passage of puberty is a point that with the lower classes in all lands marks a dulling of intellectual power, and an arrest of moral growth. But the higher brain at the same point takes up life at an advantage. It is able to foresee consequences, and comprehend the laws of chastity, temperance, and responsibility, as personal obligations. It sees also more extended cares springing from its relations to new lives of its own begetting. Marriage is a psychical as well as physiological fact, involving all of responsibility, wisdom, and religion.

Conscience is, therefore, by no means an absolute authority, but a basis for moral growth. It is that in us to which all environments, of a sort narrow, or a sort wide appeal; while under favorable circumstances it is the avenue through which the Infinite Purpose of Nature appeals to us to produce sudden and vast upliftings of desire. The stars drop into voices, and the heavens become monitors, as we look up at night. The Universal Moral Purpose speaks to us; we respond. The result is love for goodness, and a conviction of the love that goodness has for us. The physical universe becomes a psychical home; and "Our Father" is the harmony that gives rest to our longing.

Ethical purpose is, of necessity, the purpose of all the past, brought into more positive supremacy and subjectivity. I can no more conceive of a beginning of morals than a beginning of matter and motion. The ethical runs back, as the intelligent runs back, into unconscious nature. It has no beginning. The universe itself is ethical. The fact of degeneration does not disallow this. We shall not, as evolutionists, quarrel with a modified doctrine of a Fall.

For when Nature makes a great stride she makes great demands; much greater than most creatures can endure. The passage from brute to man was one of the most stupendous leaps, and it involved an enormous effort of the individual. Every great stride in civilization has had the same effect, making such extraordinary demands that the masses have been left behind; nation after nation lapsing in the effort, and falling into a degenerate barbarism. Our own populace is largely composed of moral failures, inert and helpless, and only borne on the tide of stronger souls. The probability of greater leaps lies before us, in the way of psychical development and moral demands. Possibly moral power, as an heredity, is increasing with sufficient rapidity to carry us safely forward. Yet it must not be forgotten that, so far, most of our best saviors have been killed. Men can not endure the truth about their actions and their creeds. Even Jesus was compelled to exercise discretion: "I have many more things to say to you, but ye can not bear them yet."

Such is the hypothesis of evolution, considered as a moral potency. Is the effect to destroy all moral standards, all authoritative supervision of conduct? On the contrary, it constantly accumulates a moral heredity; a positive inner authority, not absolute, but positive and directive. It is an authority that, like intellectual judgment, is open to amendment. Con-scio becomes established as conscience, the science of duty. This is supplemented by increasing knowledge. Man thus becomes the way, the truth, the life. Whoso seeks right manhood seeks higher life, and seeking the better life he finds moral manhood. Society, with its complexity of duties, reacts on this inherited power. Public opinion is the average moral experience and heredity of a community or nation. This acts to hinder the highest individual conscience, but equally to aid the lower. Vice and virtue thus become, to an extent, matters of unvolitional imitation. There are epidemics of virtue as there are of vice. The religious revival may involve either or both. . Religious enthusiasms frequently break out in the direction of sanctified lust or self-abasement. No religion exists which, in its supreme fervors, does not involve the essentially vicious as well as the highly virtuous. Dancing manias and salvation-army epidemics are equally religious ebullitions.

As an educational hypothesis, evolution emphasizes the absolute unity of the individual, body and mind. Its full pressure is to establish morals on physiological grounds; to demonstrate the exact relation that exists between physical states and moral conditions. The supernatural theory of conscience teaches a duality of body and soul, and neglects where it does not abuse the body. Evolution, as essentially a moral science, exalts the whole being in its entirety. Moral education hereafter must be a complete unfolding of the individual power to judge for itself, and to learn to judge. Freedom is worthless that is not moral freedom. School government will cease to be the subjection of weak, unformed intellects to the domination of arbitrary will, or equally arbitrary routine; while religious service will no longer involve the battering down of protest and feeble moral strength before the godlets of the gods.

I have aimed at demonstrating that moral life in man is based on the tendencies established in lower life, and that in him it follows the same laws of development. A larger reasoning faculty, more complicate physiological relations, widening experience, dependence on cosmopolitan living, and a cosmical outlook, and therewith a vastly larger heredity of moral accumulative judgment, opening his mind to inspirational conjunction of forces, is the path man has followed. It was followed in humbler degree by all life below him. The moral life is never dissevered from the physical; evolution is a unit.

I have aimed also to establish that the struggle for existence does not begin and end in a mere hard-scrabble of beings for food and breath, but that the farther we advance with evolution the more exact and more striking are the purposive efforts of Nature. When we reach man we are convinced that he is not a mere hap in a tumble of atoms, needing and allowing that at last an extra-natural Creator shall show forth in him the law of right and the purpose that is good. Review for one moment the road of life. 1. Out of the preorganic, where the crystal dreams of the flower, arose also the protoplasmic basis of life. Life was already on the road from which it would never turn aside until it had reached its summation and culmination in humanity. 2. The cell appeared as the unit of life, organized with a purport already definite, a purpose pointing out of an apparently aimless void toward rhythm and order. 3. The cell climbed, by rational, purposive steps, to the vertebrate structure, in which the organically active functions concentrated in a brain. 4. The vertebræ rose upward, gathering the multiplying nerves into a throne at the top, on which it seated the king. The law of struggle was now ennobled, and the idea neighbor widened. The unit self became the multiple unit Infinite-self. The universe was home; the ideal was Father. So, straight forward, with its eyes in its forehead, evolution moved, never purposeless, ever beneficent.

Nature is eternal progress. There is a divine uplook from the beginning. Gravitation and all unorganized force tend toward meliorism, producing out of chaos order and rhythm. Life from the outset is co-operative. The struggle of the vegetable is, in its sum, for light and air. The elbowing of the trees ends in beauty and utility. It is egoism, plus a germ of friendship. The struggle of the animal world is rarely to destroy, but to preserve. Destructive insects are in the main scavengers, turning vegetable decay into animal life. The tiger eats to live, and kills to feed his young. The purely destructive creatures are cases of degeneration. The robin destroys worms for young robins. We do not consider her malevolent. She is such from the worm standpoint; she is not from our standpoint. The aim and end of the struggle all along the line of evolution is not more death, but higher life. The product is at last man. Without the struggle for existence, no such creature could ever have existed; but, amœbas once existing, it must have been amœba forever. The theologian explains evil as the contest of man with God; evolution says it is only unfinished good. Life from the outset has been a co-operation of elemental forces passing to higher forms of effort. Man is the most profound illustration and product of the ethical aim of Nature in the unity of his parts. Like all other creatures in the line of evolution, he must die. What for? For a higher style of physical organism? Nature has apparently given over effort at further physical evolution, and turned all her force to ethical development. What then? The ethical man strives not for eternal continuance of physical functioning, but for ethical continuity. His life, if perpetuated, must be in his relations to Life—the supreme ethical Purpose—and not to the organs that life has created. Is his individuality, therefore, to be merged in a succession of generations? or in a new evolution of his own substantiality in higher relations? We may at least assert that, while in lower life no form of existence could be more than a cycle, under ethical conditions our perpetuity depends on the degree of our union with All Life; and our identification of desire with the Eternal Purpose. In the flesh, ethical conditions certainly react on the body, and prolong as well as intensify life. They also create for us a new life that abides for us in the neighbor, in the Father; a life that even now is alien to the body life.

The future of evolution must be in the way of higher ethical perceptions and loftier ideals. The dream of ethics is a reign of peace. All nations have a myth of a golden age to come. Baldur or Jesus are the hope of the world.

What a contrast is this hope to the condition of the savage or the brute! Mr. Galton estimates that "every antelope has literally to run for his life once in every two or three days on an average; and that he starts under a false alarm many times a day." Sir John Lubbock adds: "So it is with the savage. He is ever suspicious; always in danger; always on the watch. He expects nothing from his neighbor, and does to others as he believes they would do to him. The female is even more wretched than her master. They are in many races dispatched as they become old, and rarely die a natural death. Even in religion the savage creates a new source of danger, and peoples the world with invisible enemies." Civilization labors hard to get rid not only of the brute struggle but of these invisible foes of the imagination. Evolution has had the task of at last removing the supreme terror, who was supposed to have "created some to everlasting damnation"; and whose eye was ever on the watch to trap his enemies, who were none other than the creatures of his own hands; between whom and man there was an innate enmity, an aggravated contest, that could never be healed but by the shedding of blood.

The latest and fullest lesson of evolution is this, that we should cease altogether seeking a moral finality. Some noble souls are ever dropping into the conviction that at last their pilgrimage after truth is ended. A creed that is anything more than a milestone is a blunder. As we find animals on the road, so is man, and ever must be. The rose never will quite reach its ideal. Our hope is that our hope will never be fulfilled; that is, filled full. We must get accustomed to the truth that the mind, with ever-widening experience, must ever change the horizon of belief.

The study of evolution will none the less deliver you from that other mistake, that ethical doing is destined to fill the place of ethical thinking. It is quite as important to think correctly as to do honestly. Sincerity and activity do not constitute all of morals. Side by side with a life of bene-volens must be the life of careful painstaking study. While you reform without, you must inform within. We are constantly in danger of ethical cyclones. The wind that blows away dead theologies learns to revel in destruction.

Life—larger, fuller life—is the whole purport and hope of evolution; not mere doing, but living. It is being a part of eternal living that makes your grandeur. To live more strongly in thought and in deed, and therefore more beautifully, manfully, honorably, is religion. It is because you are a gemmule of God, a child of life, that makes you preservable or savable. One of the most profound of living writers, Edmund Montgomery, sums up his researches thus: "It is biologically evident that a living being does not move, feel, and think for the ultimate purpose of feeding; but that it feeds in order that it may reach higher stages of development." He does not mean that the simpler creatures are conscious of this aim and purpose, but that in the economy of Nature such is the steady tendency of functioning. By feeding, the whole process of evolution began, has gone on, and is going on. To-day the highest hunger is, however, no longer for molecules, but for rightness and love—a supply for those ethical demands that energize in human progress. Happiness? No! This is not the end of living, either of unconscious nature, or of conscious man. Happiness is but the harmony established between the feeding and the growth. The end is higher power, broader functions, grander organization; in fine, development. Altruism that finds its end in happiness is of a devouring sort. The true ethical end is the enlargement of the soul's sphere of living, by making our environments to be truth, honor, temperance, justice—cosmical and eternal ethical laws. The ethical finality is to live the most fully. and to enable others to do the same. All progress ends in higher conceptions of life. All crimes are such, directly or indirectly, as depriving life of some of its functions.

Earlier morals rarely went beyond the idea of doing to others as inferior to yourself. Slavery was universal ; captives generally sacrificed. Romans held no one's natural rights to be equal to those of born citizens. To the Jew first, and also to the Gentile, was the utmost stretch of human valuation. This spirit still survives in a very large degree in the political and social treatment of weaker races, and of the laboring classes. Christianity has never been able to comprehend the golden rule. Life that has come in conflict with its dogmas has had little mercy. Worst of all is the ruthlessness of its sacrifice of the human in the life to come. The whole machinery of the Church has been made to turn on the morals of a Deity who will eternally torment a part of his creatures. Socrates, four hundred and fifty years before Jesus, said the worst of all evils is belief in a bad god. The God of Christianity, as defined by creeds, does not often represent our better evolution. He is frequently neither just nor temperate. The Church cultus as often represents power and righteousness based on autocracy and will. Natural evolution has carried us beyond such convictions. Slavery is dead. War is abhorrent. Cruelty to animals is a State crime. The laws of temperance are informing the masses, while justice is creating a state of human equity never dreamed of till within one hundred years. Undoubted loss of moral power is in some cases involved in modern civilization, but compensation accrues in other directions. The chief end of our times is a system of education wholly divorced from the unevolved morals and crude savageries of old theologies ; an education that recognizes that to create moral functioning is as much a part of its purpose as to induce intellectual action. Meanwhile we are rapidly learning to recognize the fact that in this life-struggle, which has so largely passed into ethical conditions, he goes quickest to the wall who is morally most unseemly. The licentious die out in the third or fourth generation. Survival belongs to those who obey the law that is altruistic. To unfold this law, to define and demonstrate that to be the richest largest life, and best worth living, that aims to live for others and in others, is the education of evolution. The religion of evolution is that system of ethics, in belief and practice, that reaches after higher forms, higher functions, and nobler expressions of idea and being, of progress and hope; that links life to life, and infuses Nature with God; that demonstrates the conscious compensation that comes to benevolence, charity, and self-denial in the way of a crown of freer, larger life. No king, enjoying a royal triumph, ever reached a tithe of the joy of a Jesus dying for his enemies!

We are in all probability but just over the threshold of the ethic career of life. How can the evolved jelly-fish comprehend evolution that is to be eternal? Civilization has hardly begun to fulfill its purpose. Our heredity is strong with animalism, but it has opened sufficiently wide to enable us to hear the sound of the distant future coming to us as hope of immortality. We have thought out victory over death. All our life-energy will yet be concentrated in larger, nobler, intenser living. Decay can not touch the life-principle of the universe. The whole universe is food for the ethical purpose. Not an act of Nature, from the winds that leaped ages ago across Himalayan heights to the trickle of lime-drops building stalagmites in a sunless cavern, but pointed toward the evolution of moral character in creatures not yet evolved. Man is the fruit, but not the ripe fruit, of evolution; and his moral character is the product of all the conjoined forces that work in atoms, or in universes. He is already child of cosmical environments, but it does not yet appear what he shall be. He weaves now at the loom of his own destiny. It is Nature and her child—the Father and the Son; the Infinite finitely felt; the finite infinitely yearning.

"Let us take to our hearts a lesson—no lesson can braver be—
From the ways of the tapestry-weavers on the other side of the sea.

Above their heads the pattern hangs; they study it with care;
The while their fingers deftly weave, their eyes are fastened there.
They tell this curious thing, besides, of the patient, plodding weaver—
He works on the wrong side evermore; but works for the right side ever.
It is only when the weaver stops, and the web is loosed and turned,
That he sees his real handiwork—that his marvelous skill is learned.
Ah! the sight of its delicate beauty! how it pays him for all it cost!
No rarer, daintier work than his was ever done by the frost.
The years of man are Nature's looms; let down from the place of the sun,
Wherein we are weaving alway, till the mystic web is done.
Sometimes blindly; but weaving surely, each for himself his fate;
We may not see how the right side looks; we must often weave and wait."

LECTURE VII.

THE SELF THAT IS HIGHER THAN OURSELVES.

THE history of life, grand in all its chapters, leads us steadily on to the supreme question: In whom do I live, and move, and have my being? Is matter the matrix in which, by the action of mechanical and chemical forces, is given birth to all the varied phenomena of the visible universe? Whither has evolution led us? Does it drop us into a heartless materialism, or lead us to the open arms of a Father?

It had become an absolute necessity that the world should lapse into atheism. From the diminutive standpoint of a God who acted the part of creator from nothing, and involved in his moral government the weakest traits of mortals, there was no possibility of rising to any adequate conception of a Supreme Being. Yet science used the language of atheism only in antagonism to unworthy conceptions, which it has hastened to displace with generalization and synthesis of all the facts at the command of the human intellect.

Take your stand at that indefinite point where life began on our globe. Passing by the cell, we come to the rhizopods, which have not even cell-walls; and which by the utmost analysis can not be said to have one specialization, except hunger. The rhizopod eats, it devours protoplasm; it grows. It has the functions of life. Biologists agree that it has sensibility. Just this side of it cell organization begins. The rhizopod is as much a part of the inorganic world as of the organic; and it is a self; a subject, as well as an object.

Lower down, or rather on a concomitant line, the crystal arranges its atoms according to principles depending on sensation. Touch a crystal that is forming, or touch an insect's wing that is growing, and growth in either case adapts itself to touch. A nerve is the organization of this primitive sensibility. Trace nerve development from its rise as an imperfectly defined filament, step by step, until you find the superb complexity of the human nerve-system; observe sensation differentiate into senses; its functional potency become organic in smelling, tasting, hearing, and seeing. In the sponge these are merged in common sensation; but are they not truly there? The sensitive-plant recognizes touch; is it not the same all-embracing sensibility that exists in our senses? Nor does the utmost differencing of function and organs prevent the retention of a degree of sensibility of a general sort, underlying the senses, rarely called into service, and seldom recognized, but capable of being called into action, even in man, under abnormal conditions. There is no escaping the conclusion that the universe possesses sentience as a universal quality and fact; and that sentience is never devoid of aim and intent.

So it is that, in considering the origin of life, the cell does not detain us at all. Life does not begin there. Protoplasm itself involves previous subjectivity. It is life-stuff with a purpose in it. This purpose may not yet be expressed in arms, legs, and a head, but it will come to its destination in due time. We are carried back of organic life in spite of ourselves, to find substantial life and logical life. According to anatomy, function precedes organism; the cause of all organic change is or involves functional effort. So life, with its sum of potential functions, logically precedes organic phenomenal life. Mind is the subjective of matter; matter is the objective of mind; as subjective and objective of the same substantial unity, they are one. Mind is only in matter; matter is only in mind; they twain are one. It is the eternal and primal marriage; the dual oneness of the universe. The objective material universe is the subjective mental universe, approached from the outside. Mind is not something apart from matter; but is the sum of feelings, actualities, phenomena in matter.

To place this in light as clear as possible, we must rid ourselves of false conceptions of the organic and inorganic. Precisely as the animal kingdom does not rise out of the vegetable kingdom, but they two are collateral evolutions of one common organic tendency in life, so the organic and inorganic are two concomitant outcomes or processes of a common universe. The universe as a whole contains the potentiality of the two forms of existence, organic and inorganic. The parallel is accurate, for as the plant and the animal kingdoms diverge, they grow into a companionship and interchange of offices, whereby each reaches a perfection it could not have done alone; and they both hold ever in common certain functions, that indicate their rise from a common matrix; so the organic and inorganic universes are mutually interdependent, exchanging offices and substances, yet neither ever passing wholly over to, or containing the other. If either could be the matrix it must be the organized, for it contains what the inorganic does not. The inorganic contains substance and energy; the organic contains substance, and energy, and sentience. Back then of both must lie the matrix that contains both, a cosmos that is substance, and energy, and sentience. Out of this evolve, divergingly, the inorganic and the organic co-ordinate universes.

Nor can the terms inorganic and organic be used without more careful definition. In reality the inorganic is itself organized. The crystal has its definite laws that govern its formation and dissolution. The sandstone and the limestone are really organisms, formed by definite processes. It is true the law of their formation is more external. Yet we know very well that the crystal determines the nature and order of its own accretions. The matter of phraseology is not so important, however, as it is to clearly apprehend that the real universe is one, and that the organic and inorganic are two collateral processes thereof.

Neither can the organic ever pass wholly into the inorganic. It can only give to it what it receives from it, that is substance and energy. Are these any more realities than that which added thereto gives the organic its glory, I mean life? We can get no possible grasp of this question so long as we play fast and loose with this matter of sentience. It is an ultimate; and it does not belong to the inorganic universe, but it does belong to the organic, and to every phase of it, either in consciousness or in unconsciousness.

Let us how follow this line of evolution farther, not supposing that at any point we are to secure, by some trick, a new constituent by the mere process of evolving the old constituents. You can not get spontaneous life by shaking, or mixing, or environing elements that have not the sentient in them. Cork up, or uncork, substance and energy, and it will still be substance and energy—the inorganic. If you can add sentience you get the organic. As soon as sentience appears organic life begins. What is organism? Objectively, it is taking a definite form; subjectively, it is the possession of a purpose, a tendency, a law, which we term heredity. Heredity is constitutive character. Call it sensibility, feeling, apprehension, or sentience, what you will, the simplest life is expressed as hunger—a directive force. This is accompanied by pleasure and pain, satisfaction and dissatisfaction, which is inevitably recorded in the initial organism—the structure. This constitutes a bias or growth-tendency, which is equivalent to memory. So that in the absolute origin of life are involved, underlying all structure, choice and memory. And we know that, from the beginning, all the magnificent panorama of life, that constitutes history, is the result of hunger differentiating into choice and memory. Life moves onward from the mere struggle for protoplasm to the hunger for righteousness. But at no time is sensibility so active, so complete, as in undifferentiated protoplasm, as it exists in the brain.

From whence, therefore, does the cell arise? Are we palsied in our search when we come to the rhizopod? Must we assume an extra-natural Power to establish the link with the pre-organic? Or are we on an open road that carries us over from the differentiated life to the undifferentiated? Is it not in reality one life—the absolute attribute of the universe? *Vita pro vita*—life before life, and in order to life, is axiomatic. There is no such conceivable thing as a dead universe and a living universe. The inorganic and the organic are alike processes of Life. They interchange offices, and are mutually interdependent. Animal life could not continue for a day but for the collateral vegetable kingdom. So the organic must cease at once but for the inorganic. These two processes of Nature are complementary. The inorganic draws the frost lace-work on the pavement, while the organic does the same with a woman's needle or an engraver's brain. It paints sunsets that waken poems in the brain of Homer. It furnishes protoplasm to the scarcely more organized, yet hungry protoplasmic amœba.

Life then is a mode of the universe. It is an eternal necessity. It is the I Am. The local appearance of organic phenomena depends on the presence of protoplasm; but protoplasm by no means necessarily covers all phenomena of sentient existence. Cope, in a masterly argument, entitled "On Archæsthetism," concludes: "The question naturally arises, Is there any generalized form of matter distributed through the universe which could sustain consciousness? The presumption is that such a form of matter may well exist." Organic living as observed in this world may reasonably be supposed to be but one spontaneity of the universe. Digestion is a purpose established in protoplasm, to reach *special* ends. This is the road of evolution.

Natural selection is only obedience to subjective precedent sensibility, involving choice and memory. The hypothesis of evolution confines itself mainly to the study of the objective acting on the subject, that is environment modifying this innate spontaneity hunger. Evolution begins, and therefore our study of evolution begins with a certain amount of heredity in the very dawn of existence. Functional heredity lies in the first cell as well as in every succeeding embryonic cell. You will never get back of it. The law of this heredity bears, with magnificent certainty, along the tangled road of substance and form, until it has brought forth the organs, and no other, which in any case it involves and requires. Instead, therefore, of an extranatural will molding and shaping us, an innate immanent purpose is "becoming" into organic relations. So a crystal is shaped by a precedent subjective law; a heredity of purpose. And whether we turn to the organic or inorganic processes of Nature, we find heredity established as a universal tendency. The crystal obeys its heredity as truly as a human being, and its form is, like that of cell-growth, modified by environment. What is this primitive heredity in both organic and inorganic conditions, but a pulsation, propulsion, or spontaneity, of that pre-existent Nature of unorganized conditions and states—that is unorganized to us—in which lies the real mystery of existence?

The marvel of life is that it brings to us, in the cell, all that has been achieved through millions of years; and so we inherit all past ages and past modifications, not only human, but animal. All history is in us. Edmund Montgomery, with eloquence rare as his own scientific and dialectic skill, says: "You are to-day the inheritor and trustee of whatever life has yet done." But it is not merely what has been wrought out in the history of life on our globe that, in the cell, comes to us; but back of that the cell brings its own pre-cellular inheritance. It comes with all eternity in it. "Mind is the original property of the elements composing the substance of existence." "Out of the brooding gloom of insentient Nature living activity slowly arose. It shaped its vital mold, and the tide rolled on and on, up to, and is now realized in, our consciousness." In such passages, Montgomery flashes out the great truth of truths. Yet the reader must not gather from the poetic phraseology that the scientist and philosopher would teach that the universe, apart from, or before the drumbeat of organic development, was a chaos of darkness. From our relational standpoint we can only behold the glory and light that are relational to us. What is the highest glory of the universe no mortal can conceive.

A protoplasmic cell not only involves previous subjectivity, but requires objective action. It contains the potency of not one cell but millions; and the process of living is required. Those who speak of the cell as the origin of life, or its beginning, know well that they have only established a *reductio ad minimum.* We must abolish the idea of a beginning of life, as we long since gave over the idea of a beginning of matter. By all paths of investigation we trace life back to pre-existing essential life. How far we may make this essential life a subject of study and thought is a larger question that we can not escape.

§ 1. *Is Essential Life a Conscious Life?*

What are we reaching by this process of investigation? If God, what kind of a God? An existence as dull and heartless as the stones and elements? Let us see. Biology of late begins to assure us that organic specialization is by no means a passage from lower to higher, except only organically. It is not up, as indicating that protoplasm differentiated and specialized in a hand is higher than protoplasm undifferentiated in the brain. Organic forms for specific purposes do not indicate an exaltation of substance but a relative exaltation of organic structure. Organization is the restriction of free protoplasm to one method of living and doing, by means of an established restrictive tendency, accumulated in heredity. That which in lower life was, according to desire, either stomach, foot, or other activity, is now foot only, or hand only. There is an organic rise; but a going back from the free sensational responsive activity of the undifferentiated protoplasm.

Do we, therefore, deny or affirm consciousness of that life which, pre-organic, we have discovered to be the substantiality of the universe? We must first define consciousness; or by a careless use of terms we shall end only in confusion. Consciousness is not sentience, but the result of a comparison of sensations. It does not lie in the primitive conditions of life, as these appear in the amœba, but where functions have become organic and specialized, allowing a *comparison* of sensations. The simplest existence knows what it knows directly and simply; man knows all things by comparison. Unconsciousness is a lapse of consciousness into automatic habit. It does not, therefore, apply to primitive creatures to any appreciable extent. But man, organically, acts for the most part unconsciously. No unconscious rational act is performed without previous consciousness. So the ant, and bee, and all creatures of instinct, are cases of lapsed consciousness. Whatever is finished, either in structure or tendency, no longer allows of comparison in the way of choice of actions. The heart and the lungs, which originated as processes under the direction of will, are now in higher animals wholly automatic. Instinct is the precision that puts an end to reasoning processes. You will note, however, that while any organic process loses consciousness it does not lose sensibility. The primal essential quality is retained under all circumstances, but the qualifications that have arisen in consciousness pass out again in unconsciousness. Consciousness is, therefore, a result of the process of organization. It is a function of incompleteness; unconsciousness of completeness. Life, rising out of the great womb of the pre-conscious, moved off in specializations. Each functional desire formed to itself an organ. All organized power is part of the individual life-energy, drafted off in a special direction, with special mechanical appliance. When, however, any such organ approaches exactness and precision, and no longer needs the supervision of comparative reason, its action becomes automatic. Consciousness indicates an incomplete tendency; unconsciousness a finished effort. Pre-consciousness antedates both, and is the general sensibility, out of which they rise. Consciousness is a state of self considering itself; unconsciousness is a state of self that operates perfectly without supervision. We are conscious of reading or climbing, but unconscious of digesting and breathing. As consciousness is no longer required in one direction it intensifies in another. With man the present intensity of conscious application is in connection with the latest formed organs, the hands, and the throat, and the cerebrum. In man, brain-consciousness has attained so large directive force, that we consider ourselves as an ego, a unit—that is, we have self-consciousness. We not only are able to consider the relation of sensations to a part, but of the parts to the organic whole. Self-consciousness predominates over all other consciousness. Its seat is the brain. There is no mental energy like that of the nearly undifferentiated protoplasm of the brain. In a previous lecture I have shown that before Nature could create a human being, she must secure free hands, vibrating vocal cords and, thirdly, a predominant cerebral brain. This last is no more nor less than a storage of protoplasm, correlated to the whole nerve system. Without this storage, man could be only another animal, highly conscious perhaps, but not self-conscious.

I have dwelt on this matter with more length because biologists are only beginning to apprehend it. The nearer we go to primitive life-stuff, the nearer to mind. Organic life drafts off energy for specific purposes; but no full mentality lies in any specific organ. The larger the brain storage, relatively to other factors in animal economy, the more directive mind-power.

Let me briefly review: 1. Pre-conscious sensibility (mind) is a function of the universe. 2. This preorganic life eventuates in a comparison of sensations (consciousness). 3. This becomes a synthetic power in man, and, lo! self-consciousness. 4. Unconsciousness is a lapse of consciousness, owing to a completed functioning. But self-consciousness does not lapse except by degeneration. 5. Mechanism or organism is the result of purpose and desire in primitive life-stuff, manifested as hunger.

But at the outset all life was one. The animal kingdom and the vegetable had not differentiated from each other. There was in reality but one kingdom. The cell contained either or both in one. It was not for ages that they diverged. So you see that pre-conscious sensibility belonged at the outset to the vegetable as truly as to the animal; that is, to the common kingdom, which is pre-animal and pre-vegetable. But in the vegetable kingdom this pre-consciousness has wholly lapsed into unconsciousness. The reason of this was that the functioning of vegetable life rapidly became exact, perfect, and automatic; that is, Nature forgot herself in that direction. This is not quite true, for in vegetable life a germ of consciousness still is manifest; but, in general terms, the vegetable kingdom, lacking a brain, that is failing to retain a storage of protoplasm, became automatic.

The biologist states the case in this way: Protoplasm is formed by raising polarized matter to vital, and overcoming chemism which disintegrates. The energy of living protoplasm, derived in part only from the sun, directs energy so as to produce complex protoplasm. Vital energy, moving out into organic complexity, carried with it sentience. This in one direction involved a storage of life-stuff unspecialized, and with it high intelligence, while in another direction no storage was achieved, and no intelligence beyond sensation. Man is least complete, not most complete, because he retains most of the energy that is not run down into specialization. Death is life-energy run down to the level of chemism. Life is energy resisting chemism ; and involves purpose and organic power of heredity. Creation is specialization, and retrograde. Specialization has given predominance to the head, and has there located a storage of pure protoplasm. The brain is capable of most intense molecular action. Any tendency away from this toward molar or mass action is not a rise of energy, but running down of energy. The molar and the molecular action in the human being are largely antagonistic, for the brain, if purely dominant, would pull down what it rules. The two poles of the complete organism—that of sentience expressed in reproduction, that of intellect expressed in thought—not only antagonize each other, but they both antagonize specialization. That is, the reproductive faculty and the thinking faculty, by excess of molecular action, draw off and exhaust the vital energy expressed in organic directions.

We are now ready, after a perhaps too lengthy but necessary digression, to answer the question, Who or what have we found in tracing life back into the pre-organic universe? 1. We do not plunge into a chaos of unconsciousness. Hartmann, and other pessimists, do not fail to confuse the unconscious—that is, the condition of lapsed consciousness—with pre-consciousness : on this confusion rests the whole of their philosophy. 2. We do not find consciousness as an attribute of Nature ; for consciousness arises in organic life as a consequence of organic functioning. It is specific, and not generic. 3. We do find sentient life, involving intelligent aim and desire, expressed most simply as hunger. We can justly affirm intelligence of the universe subjectively, for only the intelligent can work intelligently. Intelligent method involves intelligent being. Consciousness and unconsciousness, not being universals, are limitations of self as distinguished from other self. But to the Infinite there is no other self. Yet there is no reason why we should say that the Infinite intelligence can be known only as manifest in our intelligent modes. There may be infinite modes of sentience besides those expressed in the protoplasmic evolution of our world. We can go no farther in this direction.

§ 2. *Where Consciousness leads us.*

So far we have been backward-lookers, searching at the origin of organic life for its originating principles, and what may be involved therein. We do not find either an extra-natural Creator, or a conscious natural power or personality. We turn now to an entirely different field of investigation. Leaving the cell, and pre-cellular life, we pass to inquire of the climacteric conditions of life, what they are, and what they involve, substantially and logically.

Con-sentience, or consciousness, we have observed to rise out of sentience or primitive sensibility. Consciousness in turn passes into self-consciousness. Is self-consciousness the limit of possible evolution in this direction ? In self-consciousness we have already passed beyond a comparison of mere sensations. Consciousness of self is the result of intellectual processes, and also determines self as a moral intelligence. It involves a conception of duties not reached at all by sentience, such as patriotism and philanthropy. To be self-conscious is, therefore, to be conscious also of a self that ought to be; an ideal self that we should aim after, and may ever approximate.

What is this ought-to-be self, that which *we* should purpose, but the extension of that primal pre-conscious purpose that we found in the cell, but which is now manifest in ourselves? In other words, *we ought* to aim on the line of that aim which has always worked in life upward. We found a purpose in the lowest life to work upward. Now we find in ourselves a personal conviction that, consciously, we should co-operate with that purpose. Not to do it is sin; to do it is the highest virtue. Not to do it kills—kills us morally as well as physically; to do it increases *life* and ethical living. We thus learn in our own consciousness much more of that pre-conscious purpose. What we could not say of it before we can say now, that it not only involves all the purpose that we found in the cell, but all that we find in ourselves; namely, intelligent moral purpose, the working out of the true and beautiful and good. Con-science, moral con-sentience, recognizes this; for, passing to the universal, it asserts a universal moral aim; universal moral methods, or laws; universal moral principles, as justice and rectitude. The moral consciousness of man can not stop short of this—that there are universal eternal principles and obligations.

I have used the term *self*-conscious to indicate that point where reason reaches the concept man. Perception sees things and the relations of things. Conception puts together perceptions and sees ideas. Perception analyses; conception synthetizes. The animals have perceptions, but not conceptions. The dog sees a man; he has not the conception man; certainly not consciously. Savages have few, if any, conceptions, although often keen in perceptions. This power of grasping the idea, the full and complete set of relations, so as to form in the mind a unity of purpose, belongs to man at some point of his development, but it is quite unnecessary to designate the point.

But man, in his perception of things and their relations, of ideas and their relations, reaches not only a synthesis of himself, but goes on to attain such a cosmical mental relation that he at last has the concepts infinite and eternal;

that is, the infinite and eternal inter-relationship of things and ideas. This idea of infinite and eternal is complete in itself; it is all that he has found below, and in himself, which is not a temporary economy, carried out into terms of the non-finite. It is, in fine, selfhood, relieved of the limitations of finiteness.

By con-sentience we have thus reached the final idea; nothing lies beyond. We directly recognize the infinite. The idea is as legitimate as consciousness of self. It is, to be sure, not an idea that is knowable to us, if thereby we mean that we perceive all the relations that constitute the infinite. But neither is self knowable on the same grounds. The infinite is knowable in its relations to the finite, but the finite is knowable only in its relations to the infinite. It is selfhood, a complete idea; but, being infinite, we can not apply to it the *terms* or limitations of our selfhood. The idea self, or unity of intelligent moral inter-relationship, is the same in both cases. We know this infinite self-consciousness precisely as we know ourselves or any other self-conscious being. We know the infinite precisely as we know the finites which exist *in* the infinite. We can never know all the finites that constitute the infinite; but the infinite and the finite as ideas we do know. We may sum up what we know of a pebble in order to call it a pebble, and know it as such. We may sum up what we know of men in a group of relations, and call them Fathers. We may also sum up what finites we recognize, so as legitimately to designate the infinite as Him; furthermore, adding the moral, to conceive Him as Father.

Looking backward we found pre-conscious sensibility and substance, involving purpose; looking forward we have now found selfhood higher than our selfhood. We reach the pre-conscious by following back the road of instinct and automatism; we reach the super-conscious by following outward the road of consciousness. The summation of the two constitutes the dual oneness, *Father, child.*

The physical universe becomes the substantial presence of Him in us.

But we must not, therefore, apply to Him the term conscious, neither unconscious, which are both terms, as we have seen, strictly applicable only to the finite, in its phases or passages. Conscious work is not the highest form of volition. It is effort incomplete and tentative, comparing and trying. Unconsciousness is work complete, volition ended, a lapse of consciousness. The finite must ever work either consciously, as in man; or unconsciously, as in the ant, the vegetable, or the crystal. This is not conceivable of the infinite. The order and purpose of the infinite are not *in* our consciousness nor in our unconsciousness, but in that which I have all along termed pre-consciousness, a state that we have but little means of measuring or comprehending—a state of being causative and immanent, or immanently causative, embracing us not only as beings, but embracing our consciousness and unconsciousness. By pre-consciousness, evidently, is not meant a state less than consciousness, but larger than consciousness, a state of which consciousness becomes a phenomenal method. The process of development, or unfolding upward, as described by evolution, in no sense excludes what is *reached in* the process, any more than it excludes force and energy, because the *forms* of energy change. Nor can it exclude the purposiveness and intelligence which are as evident in pre-consciousness as in consciousness. The fact of law, purpose, unity, tendency onward, was as apparent in term one of evolution as in term ten, or one thousand; in the amœba as in Milton. The purposive co-operation of all evolutionary forces or energy I have shown in a previous lecture.

Pre-consciousness, passing through consciousness, passes into self-consciousness, or consciousness of the idea of things. We know the infinite, then, not in mechanism and instinct, or in consciousness, which may lapse into instinct. The conscious being would never know the infinite any more than a machine would know Him; but, having reached self-consciousness, we discover the higher Self. The road is legitimate and necessary. Pre-consciousness exists in terms of sensibility, consciousness, self-consciousness, consciousness of self-higher-than-self. Therein the pre-conscious, which is infinite, meets himself as infinite, or super-consciousness, and the process of living is complete.

We are at last, and fully, conscious of one intelligent purposive will in Nature. For (1) we are in relation to cosmic intelligence and purpose; (2) that intelligence is ethical; (3) by being intelligent it is limited from irrational chaotic action, and being ethical it is limited from injustice and evil action; (4) it is one. So that the unity which is discerned in organic life, in co-operative functional life, in moral and historical development, is enfolded by the sublime concept of an infinite Self, intelligent and moral, in whom we live, move, and have our being. The amended term is not, there is one God, but God is one.

The train of argument I have followed is very important, for it allows us to look in both directions to discover the real source and nature of life. Looking backward, we come to universal sensible life; looking onward and upward, we come to that Self-higher-than-self, that moral ideal that our consciousness affirms is Divine Self, the Real Being, the Supreme One, in whom we have our higher life, and in whom is our hope.

Involved in the primitive cell is the principle of choice, of affinity, of like and dislike, best and not best, right and wrong; at first of a physical sort, but, applied to the processes of life, this choice involves all of ethics, the ethics of the universe becoming the ethics of the individual. The physical "rita" or right becomes moral righteousness; the physical upright and downright becomes uprightness of character. The physical involves the psychical. Conscience can not exist until there arises a comparison of consequences as bearing on the enlargement and ennoblement of life. But at the very beginning there is a purpose that aims at rightness. In hunger, which is the first principle of the individual life, there is involved need and supply; the whole moral *ought*, which culminates in the later ages as "Blessed are they that hunger for rightness, for they shall be filled."

The hypothesis of evolution opens our eyes to the magnificent panorama of an eternal unfolding of relations of life, full of purposive love, which, rising from the vast unfathomableness of the sentient universe, at last lift us as conscious beings near to the heart of the Supreme All in All; and with Him, and in Him, and by Him, bid us consciously to live, and move, and have our being. This I call our heredity from God. To trace our descent from animal progenitors is but a fraction of the problem; the larger sweep of vision beholds an ancestry that embraces all life, and all purposive being.

Nature has no power to efface the record of our origin. Organism, rising ever to higher degrees of complexity, retains a substantial memory of its source. Our embryonic history rehearses our inheritance from the cell. Nor can we ever outgrow the memorabilia of our origin. Before self-consciousness had evolved higher thoughts, men worshiped in this memory realm. For the most part everywhere worship has had a backward look toward ancestors; but at times it has reached farther than ancestry, to origin, to the Father. Memory in heredity, looking back instinctively toward our origin, led our fathers to cry, as we yet cry: "Our Sky Father!" "Our All Father!" Primitive races were intuitively worshipful. This can not be explained on the ghost theory. Oldest religions are most monotheistic; that is, they are most instinct with the memorabilia of origin. Plural gods are the later evolution of a speculative consciousness. Monotheism. sees ourselves in the One; polytheism sees the One in us. Each one of us finds this memory of humanity verified in his own instinctive yearnings. We never escape the feeling of need of a strong hand to lead us, and a parent's love. This is more than our temporary dependence on our immediate parents. It is an instinct that permeates all our being, and is most strong in our manliest years. The nobler and truer our desires, the more vigorous our strength, the more convicted are we of a longing for help. It is not the cry of a babe, but the cry of a man. Jesus made his appeal to this moral instinct of the people.

Yet this backward looking of the soul ends invariably in fetichism, either physical or mental, when it is not supplemented by the forward and upward look of a rational sort, that finds God through self-consciousness, as self-that-is-higher-than-ourselves. For this reason Christianity, whenever it has dreaded and despised reason, has fallen to the worship of priest, church, or book. Appeal to the common average moral instinct has always been dangerous, when not accompanied by education of the upward-looking faculties. The older religions that contained high truth were compelled to be esoteric. They could not admit to their councils the common people. Buddha broke from this restraint, and his magnificent scheme of world-saving became a failure. Jesus refused to teach in secret, and Christianity had a narrow escape. But for Greek culture, Roman breadth of vision, and, later, the revival of learning in Europe, and the invention of the printing-press, Christianity would exist to-day only in the squalor of asceticism, trying to spell out its animal instincts ; and in the unconsciousness of ritualism, forgetful even of its origin, and unable to foresee its destiny.

Nor am I willing to pass this direct relationship to the All without recognizing, at least briefly, the positive force of the felt needs and hopes of every man. I have spoken of the outlook over the past in intuitive memory. The outlook ahead is quite as positive and definite. All evolution has led up to, and is merging in, the ethical. The perfect as an ideal, not only in law, but in Nature—in personality—is a cry of the ethical soul. The finite has ever a growing consciousness of aspiration. All theology has come to nothing good except the affirmation of divine beneficence, and the lesson of faith, hope, and peace. Ethical life has ever been the aim of evolution, from the monad up to man. Man, as ethical, embodies the eternal purpose of Nature. The future of evolution must be a continuous ethical rise. Nothing is more certain, and nothing more entrancing, than the fact that the universe, to a moral being, is moral food. More than this, man, looking-upward to the self above himself, becomes morally inspirable. Inspirability becomes a definite item in the definition of a moral being. It is a growing capacity of humanity. It is the self-established relation which we bear to God.

Is there not also in all highly conscious natures a consciousness, dimly caught, but certain, that its acts are but parts of a vast plan, into which they fit, and that its purposes somehow are parts of a universal purpose, working toward ends, and a supreme end, larger than its own will and knowledge? So, having for years worked, and after that found its work suddenly available, and adaptable to a grand use; and especially when thwarted in many directions, after many years that hindering turns out to have been for the very best; then the mind catches a flash of that other Self, that larger Will, that Supreme Container that rules by overruling—the sum of the intelligent purpose of the universe, the unity of all individuality.

So it is that reason, at first arrogantly despising the past, ends by meeting the simple instincts of primitive man, and summing up all its cosmical researches in the same word Father. Science and philosophy, combined in evolution, having led us through an atheistic interregnum, a cheerless era of doubt, and restless investigation, bring us out at last into an age of higher ethical life, and clear convictions of our personal relations to the One who is the All in All. The simple religiosity of primitive humanity, which was an instinct through animal heredity, was apparently never disturbed until about two thousand years before Jesus. Since that it has been buffeted about by interrogation. Science, arising in our own day, following rigidly the road of investigation and demonstration, leads us to recognize our heredity without interrogation.

As we look onward and upward we see not only that life and intelligence are coming to richer unfoldings, but that we are sure to reach also higher and higher moral relations. The divine beauty, truth, and goodness of the universe grow upon us. The oldest word for morals was upward-looking; so we are recreated into upward-lookers. The intelligent worship of our day, despising superstition, dissatisfied above all with ritualism, seeks for the self that ought to be, by personal union with the Self-higher-than-ourselves. So it is that, rising from the womb of Infinite Self, we come by the path of childhood and youth to face the same Infinite Self as our desire and destiny, as well as our origin.

§ 3. *Is the Higher Self Unknowable?*

I have already suggested a reply to this question, but return to it for a more careful consideration of the "unknowable" supposed to be affirmed by science. Vitally associated, substantially born of the One, how can we fail of discovering our Father, in whom we have our being? The eternal energy passes everywhere evermore into vital expression; a unity of units, which alone is real unity; an infinite self of selves, in which unity we have place and part. Is this unity, expressed objectively in the cosmos, and subjectively in mind, so alien to, and unlike ourselves, as to be unknowable? How is a finite individual different from the all-embracing Infinite? What is man, what is society, what all that we know, but a unity of units? There is no other unity. Universal life is the interrelationalism of all units of energy to matter, as finite life is the relation of certain units of energy and matter, thoroughly unified. Yet, is not man knowable? Is not man lovable? When my boy puts his head on my breast, what does he love? Tell him he touches only oxygen, carbon, hydrogen, phosphates, and energy; yet he loves on. This unit, which you thus run back into elements, is nevertheless a vital unit, an ideaful unit to him. What song! what joy! what love, bursts out of this relation! So of the universal life. When you run it all back into matter, and energy, and sentience, you have not eliminated the Father. I kiss his finger-tip in the spring flower; I feel his presence in the morning's glory. With the Persian, I kiss my hand to him in a star. My head rests on his breast in a knoll of violets and clover; not on it, but on Him. Not, It is beautiful, but He is beautiful. I know Him, I love Him.

I have indicated that still more vital knowledge which flows to us in heredity. There is not one thing so knowable as the God. Philosophy must not leave us with this conclusion as a finality, that there is an Absolute beneath all phenomena; and that, while all phenomena are knowable, there is still a something to be probed after, and yet never found. What we do *not* know is the phenomenal—that which has been and may be. We do not even know ourselves altogether as phenomenal. Yet, do we doubt our self-knowledge? It is of the same sort as our knowledge of self higher than ourselves.

There is a natural eagerness on the part of theists to establish personality of the Supreme. Yet it is the least satisfactory of all attributed terms. Our conception of person so readily involves limitation that we are plunged into a chaos of anthropomorphism. We elude the real substantial unity of the universe, and fall down before an abstract of the imagination. Yet the All is the all of the living. God is one, but one only as one is composed of many. All units hunger between themselves. They are modified by each other. But the permanent is the sum of all units. The embracing unit exists only as the units he embraces exist. God is not a *separate person* from all persons. In him "we live and have our being." In searching for the unifying person you thus destroy the unity altogether; you lose what you have found, that is, the manifesting One, while seeking to establish the One apart from and above its manifestations. Into this limbo theology long ago fell. It established a God apart from phenomena, or Nature, and thereby lost him altogether. It has feebly comforted itself by hugging and fondling definitions, and bodies of divinity, and statements, confessions, creeds, words, while the violet-scented universe has grown cold and homeless, fatherless and vacant. Nature folds no arms of tender love about those who find in its pulsations no throbbing presence of a vital, eternal sort, immanent and essential, yea, the essential substantial itself. The most pitiful of all hopes is that which, while dwelling in a divine mansion, face to face with the infinite manifoldness of the Father, sees no father, hears no father, but begs to be released from its prison-house, that it may go, in the vain hope of seeing him elsewhere. Only he that hath eyes can see, and he that hath ears can hear.

The principle of all evolution is change, through adjustment of the individual to the environment. The environment, then, must be presupposed. Go back as far as you will, there is no thing without the environment, no one without the other. The universe can be conceived in no other terms than the one and the other. This is the only basis, not only of evolution but of ethics. In it lies the moral life as well as the physical life of the universe. One bears a relation to the other. Life becomes in man the interchange of one and other. Otherwise we can not understand the ethics of life. Otherwise morals are a chance or a decree; not in the nature of things. The earlier metaphysics of Christianity were this and no more. Paul taught the "One Omnipresent Deity." "One God over all, through you all, and," as Prof. Seelye translates it, "interpenetrating all." To such an Infinite, if we apply the word person, it can only mean the Infinite as not finite; as having infinite finite relations; that he must express himself infinitely in finite terms. Still, we are constantly in danger of forming a false conception of one as distinct from the many. We are not modes of a one, but that one is the summation of us. *What*, then, am I to worship, if, indeed, I worship at all? Evidently those *manifestations* of God which I see. The noblest of these are the ethical states in man. All worship has a shade of anthropomorphism. Any effort to worship abstract uncognized right and beauty is impossible of realization. The unknowable is equally removed from my sphere of love and honor; I can only dread it. So religions generally are aspirant only in fear.

It is, then, the Infinite, not as one but as many, that we meet in our ethical aspirations. Is there an ought that binds us to worship the one except as in the many? Evidently not. It is the divine in the human that is most holy to us. That we can save or can destroy. It is the child of God, the everlasting Christ, the incarnate Love, in Jesus, in Theodore Parker, in a pure mother, in a manly youth, full of the blossoming of purpose, that we see, feel, love, honor, adore.

The worship of a Jesus is the worship of the ought-to-be self, not of the self that is infinite; it is reverence of that which we ought to be, not of what God is. Here is the place for the heart to rest. The mind can find no comfort and peace in the infinite as such.

Yet I can not leave you just here. I may make a mistake. It is the all-vital thing to find our God. I would not mislead you. There are rapt moments, not to be sought but to be joyfully accepted, when the soul is ecstatic, and we see and hear the Divine as *All in all.* These moments come to the spirit as fruit to the trees, as a natural consequence of cultivating not fruit but fruit-trees. We set our care on the dark roots and rough limbs of duty, and lo! the fruits and flowers come of themselves.

I will tell you when God shall appear to you. It is when he shall appear *in* you. When, having fought bravely with degeneration, your frailties overcome, your faults turned to virtues, in you will appear the glory of the Great Ideal, the Perfect Life, the Father. Look around you. Where is God? Where does he walk? Where does his beauty find revelation? It is nowhere as it is in a holy soul, in a beautiful nature, a conquering spirit. I believe in human nature. It is heroic everywhere. Every family has its savior. Every nation has its Wallaces, Tells, and Washingtons. The world has its Christs. There are such beautiful souls that, if I may but worship them, I do not care to think of angels. There are none that do evil altogether; no, not one. Who shall reach an incarnation of the divinely good, true, and beautiful?

And yet, once more, who knows what we shall be? Evolution points to psychical unfoldings out of all measure with the past. The world is steadily passing into ethical conditions that will lift us into vastly clearer conceptions of the All Right. Our conditions of life are not yet high enough to acquire the higher conditions of non-self. We do not even reach high enough in our development to know ourselves as we are known. There are higher grades of self-knowing, which for ever must be more and more our kind of knowing. As we reach God through self-consciousness, we shall ever know more of him as we attain higher degrees of self-consciousness. Nor is reasoning in any form the highest method of the human mind. There are times when, "whether out of the flesh or in the flesh I can not tell," one is caught up, as I have said, with a great rush of emotion Godward. It is no duty at all to feel tenderness for God, but it is a great privilege. The path of duty is the path of honor, but the path comes out sometimes under great flashes of God-light.

Prayer is, properly, not to the Infinite All, but to that All that is in all, the manifest Fatherhood, the Motherhood, the Sonship. It is a monologue to no auditor, and it needs no auditor. It is its own glory, its own comfort, its own inspiration, its own answer. As a song is, so is prayer. As a poet who sings his soul into rhythm and rhyme, so is he who prays love, faith, honor, hope.

§ 4. *Conclusion.*

By what other road than that of science can we establish the truth of a substantial, vital universe, which is sensible, intelligent, and ethical? Looking backward, evolution leads us to universal potential absolute life, ever actualized in vital phenomena. Mind is what all processes involve as a substratum. You can get no escape from the fact that all vital energy operates in the line of immanent purpose. What has been wanted, and what evolution furnishes, is the logic of the pre-cellular, pre-conscious world, showing the necessary causal involved in the cell. There is something more in our heredity than the chemical and vital cycle, that finds its synthesis in a homogeneous life-material. History is not only the hunger of the body for material food, but the hunger of the soul for higher organic relations; it is a series of spontaneous outbursts of a growing consciousness of a higher self. The universe is nowhere quiescent or inert; all is quivering with energy. Life is the overflow of energy, in forms of force directed by sentience. "All the myriad phenomena of the universe, all its weird and subtle changes, in all their minuteness, from moment to moment, in all their vastness, from age to age, are the manifestations of a single animating principle, that is both infinite and eternal." Eternal persistence of force is the underlying fact of that eternal modification or adaptation to environments under which law appears, in heredity, as a vital struggle, endeavoring to secure a permanent adjustment. Heredity is a systematized and ordered method of modification. Nothing is more absurd than the use of the word force as something blind, aimless, and lawless. It is never, in any display of it, for one moment, anywhere, aught but the legal, volitional, purposeful direction of energy.

But in no direction does evolution assist us in a synthesis of the universal more grandly than in emphasizing, illustrating, and demonstrating the unity of Nature, both moral, intellectual, and vital. The defenders of a creation have laid great stress on the supposed necessity of their view to establish unity; for how could accord, order, law, cause, and effect, otherwise than lead back to a Final Cause and law-giver; a being apart from, and above all things—supranatural? But the startling supplement has always followed that Nature has eventuated in a moral chaos, a ruin, and is now a helpless, inchoate thing; and that the interference of this extra-natural power has been, and always will be, needed to correct, amend, and supplement. This is not the road to God. It is incomprehensible and atheistic. It supposes a universe, in all its movements, in all times, self-coherent; producing magnificent intellectual results; tending ever to ethical glory, but at certain points wholly breaking down, and without supernatural interference, a failure. The vital question is whether, in all the universe, there is a present immanent divine energy, or only an occasional God. The evolutionist, in the language of an eminent physicist, contends that "the passage from crystalline forms in the pre-organic world to the lowest forms of life, and from them to higher forms, to the highest, is the growth of a single natural process. He grasps this act of life as an indissoluble connected whole, one great organic growth from the beginning." His opponents allege that we can not make the passage from crystal to cell, from species to species, from animal to man, without special interposition of a force entirely apart from Nature.

Evolution not only denies but disproves, totally and forever, the existence of a Being over and above Nature, by whose will we exist, and to whom we go, if at all, after an escape from Nature by the aid of his mercy. To get this notion so wholly out of our reasoning and feeling that we shall not confuse our hopes or our logic with it, or otherwise compromise with it, is essential to the gathering of the full advantage of the true hypothesis. It is from evolution alone that we get positive knowledge of a supreme purpose, working as sentience and consciousness below, but rising in man, through and from his animal heredity, into the superb beauty, adaptability, and power of self-consciousness, that scans the universe, and synthetizes the cosmos, until conscious of Him who is the Infinite One, the All in All. It is through evolution alone that we get positive demonstration of our kinship with the eternal divine, as well as our heredity from the animal world, and world of matter. So that, if on one side it seems to derogate from our dignity, on the other it removes from us the shame of being mere waifs of matter, having exactly the same origin as beasts, no more no less ; but, worse than the beasts, debased, fallen, condemned, damned. Creationism can do no better by us than to bring us, one by one, into the world, by birthright creatures less than all other creatures, with no glory but that, at some antecedent creation, the creator breathed into our dust the breath of life ; from the very outset having lost our only precedence by the disgraceful conduct of an ancestor ; and to-day existing by the sufferance of our Maker, under condemnation. What compensative glory can we find in a supplementary redemption which fails to redeem but a fragment, while those it restores remain forever as the wreckage of a disrupted plan of a supreme mechanic ? Evolution, on the contrary, shows us that we are partakers of the infinite self-consciousness, the eternal life—the essential purposive element of Nature—that we can degenerate if we will, but that, as a fact, the race has risen to behold the Father face to face.

The argument for a final cause outside of Nature had already broken in twain before evolution was propounded as an explanation and solution of the puzzles of both organic and inorganic existence. It only remained to clear away the dust. According to Prof. Diman, the most moderate and the ablest defender of orthodox theism, God must be considered as "the Supreme, existing *alone* and *apart* from the world." But the same writer also avers that "a little consideration must convince any candid mind that evolution pushes the First Cause back." And he also agrees that it is the duty of all theists to push the First Cause "as far back as possible." If, then, your cause of causes, already alien to the world and to Nature, can not be positively found anywhere, or located, of what value can He be, even as a relief to interrogation? The stern demand of reason for an adequate cause is answered by an adjustable potency, who is even compelled to hitch together his divine purposes, and work by special "supplementary providences"; while at each "push" of investigation he retreats into the deeper recesses of limbo. This is simply to accept of an unfindable in the place of Spencer's unknowable. This historic line of retreat has been always self-destructive. Crowded by the widening apprehension of law from one ground of special providence, the believer has gone farther back into the depths of time with his deity. Eons supplanted days. Back and still farther back he retired, hugging his creator; Science still pursuing and illumining his deeper recesses. Let him rather stand here: that God is not apart from Nature; that the magnificent reign of life and law that is unfolding year by year and age by age is but the pulsating presence of Him who is over all, through all, interpenetrating all. There can he at last rest. Evolution knows no retreat.

I do not wish to close this subject without a brief reference to the moral consequences of the later doctrine. There is nothing so terrible as the rotting down of a theology. The consequent morals, having lost the weight of authority, rest only as fetters that gall. Liberty striving to assert itself breaks into license. Since the day when the nations quietly believed in kings *Dei gratia* and priests *Dei gratia,* there has been a convulsion of moral convictions, until at last the wreck is complete by the fall of the *Deus volens.* Can evolution rebuild our shattered hopes and rehabilitate our worship? I have shown you that it can—that it leaves us neither godless nor lawless. The moral code of evolution is not weighted down by obligations involving an intricate knowledge of a divine plan, disrupted in a fall, or the remote and incomprehensible purpose to rescue a few by faith in a Saviour of whom the majority have never heard. On the contrary, the morals of evolution are right living—such living that our development shall be most substantial and unhindered, while with us our neighbors may be equally advanced. Evolution is the history of life, life, life, more life; to save life is the sum of duty. That is right which enlarges and ennobles living. That is sin which defaces and kills. Intemperance, unchastity, injustice, cruelty, are in the new code of sins, because they act counter to the ethical tendency of evolution. Salvation is to depart from self-destructive courses of thought and action. Degeneration is the doom of all those who refuse to obey the light that is in them, and love the darkness in preference. The truth emphasized by Jesus, and by his ablest disciples, that man has in him by birthright a directive ethical knowledge, a "Holy Spirit that illumines every one born into the world," evolution distinctly affirms. The Ourself-that-ought-to-be is a part of the heritage of vision that upholds the Ourself-that-is. Contemplating this moral obligation, we conform our choices to the desire that is in us. Morality is man, of his own will, moving on the lines of evolution, taking conscious charge of his future character.

I understand quite well how happily some minds will content themselves by discharging at the view I have now expounded the charge of pantheism. Perhaps the simplest way of meeting the charge would be to accept it, and then declare that the idea pan-theism is after all not so objectionable in its crudest form as that dualistic interpretation of the universe which alienates God from Nature, makes him "exist alone and separate," and leaves, therefore, all Nature to be properly and essentially godless. But there is a pantheism that reduces the Infinite Oneness to matter and force; there is another pantheism that exalts all to be the phenomenon of immanent Self. With this latter pantheism evolution does not refuse to fraternize. I do not feel competent, however, to wisely add to or subtract from the superb answer given to this charge by Abbott in that initial volume of the rising theology, "Scientific Theism"; and I shall close this chapter, in which I find my heart most deeply enlisted, by quoting from the same author the eloquent words with which he launches his convictions: "If the glorious thought of a universe, in which the adoring Kepler might well exclaim in awe unspeakable, 'O God! I think thy thoughts after thee!'—a universe which is the eternally objectified Divine Idea, illumining the human intellect, inspiring the human conscience, warming the human heart; if this glorious thought, begotten of science, has no power to stir the depths of the human soul, and lift it up to the sublimest heights of worship and self-consecration, to the service of the Most High, then religion is dead indeed, and the light of the universe is gone out forever. But, if this thought has a divine force in itself to soothe the woes of life, and minister new strength to the soul faltering in the path of painful duty, then religion is not dead, but will rise from its bier at the commanding word of science."

LECTURE VIII.

THAT LAST ENEMY, DEATH.

It is impossible for one who has followed the path of Nature in evolution to consider the glory of life, concentering in man, without the question, Am I also only a temporary factor in this progress of events—appearing only to disappear? Or is there in the process of human evolution established a power of self-permanence—a concomitant of the changing physical, which, however, has the power of perpetual self-renovation? Is my body only that synthesis of environments which can be correlated into a mechanism suited to a higher relation to the universe?

The thought of immortality seems to have come into the minds of men as a late intellectual conception; but it has taken possession of all civilized races as an intense hope and conviction, so that we may say that now, apart from primitive races and degenerate savages, all men believe in life beyond death. For a basis for this belief they have questioned philosophy and theology, but have in all cases been compelled to rest either in the authority of revelation or in the speculation of metaphysics. Science destroys faith in both these authorities; can it do any better itself?

§ 1. *The Purpose in Evolution fulfilled in Man.*

Evolution has led us by a path of remarkable directness, in which there has been no tortuousness nor subtlety. We may sum up the steps so far as—1. Life is the primal fact of the universe. It involves substance, force, and sentience. Sentience involves intelligent aim, expressed at the outset to us as hunger. 2. As more highly organic conditions have appeared, higher relations have been manifested *pari passu.* As any being has approached completion in structure or function, it has tended toward a lapse of conscious purpose into unconscious automatic action; living has tended toward mechanical conditions. 3. Physics and chemistry alone, operating in Nature, produce only periodicity. However large the cycle, Nature ever returns chemically into her own matrix. The elements become mineral; the mineral rises to the vegetable; the vegetable feeds the animal; but the animal, at death, is pulled down to elemental conditions. Out of chaos comes the cosmos; but it is certain to again return. 4. Yet Nature sustains through all periodicity, and in spite of the dropping of energy, a certain most positive progressive purpose and achievement. There is a persistency in the universe that does not fail. In the world at large it appears as function and organism; in man, as character. It has produced order, grace, and goodness. This potency of purpose precedes and determines; it is immanent and universal. It is intelligent will. 5. The end of the purpose is, if we are not wholly misled, the production of those ultimate relations which are most intelligent, orderly, and ethical, and on the whole productive of the greatest degree of ethical progress. 6. The universe is a unit. The more we discover of the unknown the more we find it possessed of the same laws as the known. The spectroscope confirms the telescope that all globes are of one system, and of one substance, with one law. Nor can we discover any flaw in our conviction that honor and truth are the same everywhere; that character, like energy, is cosmical. This moral unity of the universe establishes not only an obligation of the less to the greater, but of the greater to the less; and comprehends the whole purpose in all its finite and infinite relations.

We have thus found that evolution defines an unfolding of life-energy from the definitively animal to the predominantly intelligent and moral. This ethico-intellectual state is expressed objectively in language, invention, commerce, art, and literature; subjectively in purpose, benevolence, altruism, character. There has been in the progress of evolution a positive exaltation of the processes of life to higher relations. The gates of death to the brute struggle for existence were opened; and lo! it was not death, but a new and more glorious manifestation of purpose! Reason crossed the threshold with the Golden Rule in its hand. Henceforth the law shall be that whosoever shall give his life shall find it; he shall live largest, fullest, most eternal, who lives not for himself, but for others. In fine, the aim of purpose in evolution has been ethical; and it has been steadily fulfilling itself. In previous lectures I have so fully established this fact that I do not need to delay for the purpose, to any extent, of demonstrating that ethical ends and relations are the fulfillment of the Eternal Purpose. I believe that no one will question the general purport and most positive logical import of the progressive facts of Nature.

I will at once pass to show you that man is the fulfillment of this purpose, and that he embodies in himself all that a just interpretation of Nature demands; that is, he is a being in whom evolution can proceed on an ethical line of unfoldment, a being not only embodying the whole past but involving the whole future. The purpose of Nature, which from the outset has been immanently intelligent and ethical, is fulfilled in the production of a being who in himself is capable of taking up this purpose and carrying it forward by his own determinative power.

For, if this be not so, then Nature has only to produce another being of the same sort, and so repeat herself—which is contrary to the whole process and logic of evolution, which is the sustenance of a progressive purpose through all cyclic periodicities.

It may be well at the outset to show that, if this purpose of Nature be fulfilled in man, it is in man as an individual, and not altogether in man as a collection or consecution of individuals. Why may it not be more fully, or at least as perfectly, wrought out by an accumulated heredity, passed on from one series of individuals, or one individual, to another, precisely as in lower orders of life? For surely a large number of those who have been foremost to catch the spirit of science, if not to master its data, have come to rest in this conviction. They have even found the highest evolution of unselfishness and altruism to consist in self-surrender for the good of the race; and their ideal hope is to add somewhat of an increment to the accumulated power and health of the universal individual. Is it not the sole glory of man, as an individual, to be a link of life, rather than a child of life?—satisfied to say,

"Well! I have had my time; have been
Raised from the darkness of the clod;
And for a glorious moment seen
The brightness of the skirts of God!"

Is this the destiny of the individual, or is there a potency of development in his ethical relations that will pass into other methods of living and other stages of an ethical career, and so establish continuity of individual existence? To this inquiry it is urged that ethico-intellectual evolution is the work not of individuals but of humanity, or the race in all consecutive generations. If this be true, and we are to look only for the grander unfolding of humanity by generations and ages, it is clear that, when the astronomic cycle is completed in which our material system is a factor, and when our solar system has run its race, the whole ethical achievement of Nature will be snuffed out. For it needs no demonstration to show that any life of the present kind can not be perpetual on this globe. The birth and death of planetary systems is quite as sure as the birth and death of human beings. But we believe that such cycles of order are not mere cycles, but that from them are eliminated a higher dynamic power in the universe. Precisely so from the human cycle we look for a securing of higher reaches of moral power. But if the moral results, the aim and end of Supreme Purpose, be not in some way drafted off, then purpose has been defeated. The footprints on the sands of time, the force of ancestry in heredity piling up increments of gain, and at last producing Christs and poets, will be as if they had not been. There will have been a vast struggle of Nature, passing up almost to achievement, but a failure at last. Humanity in its generations will have been produced, but the solar cycle ends, and humanity is obliterated. Purpose is obliterated at the same moment. Evolution will thus be turned into a farce. There really will have been no aim, no progress, no end. This we positively refuse to believe for reasons sufficiently illustrated in previous lectures. It is indeed noble to live for the race; but there is no ethical law that makes it heroic to sacrifice myself for ephemera of an ephemeral race.

There was abundant reason, and apparent, why, as organisms were slowly raised from amœba to mammal, each one should be blotted out so soon as its essential purpose could be better embodied in a higher form; but when the ethical life was reached, involving goodness and truth, the permanent factor of evolution must be the individual, with continuity of existence. The end of evolution must be, if itself purposive intellectual and determinative moral, the securing of that storage of ethical relations and power that in itself can take up the purpose and sustain the desire of past evolution, and carry it forward even when the material universe shall have completed its end and its present form been swept away.

To the argument, as thus stated, we need also to add, and bear well in mind, that it is a mistake to suppose man is summed up in the race, or that the race is the sum of individuals; on the contrary, the individual is the sum of the race. For each individual, in his embryonal and in his free career, contains an absolute memory, and his development is a rehearsal of the whole past. Humanity at any period or point is no more than the multiplication or repetition of individuals in more complex relations. John Milton and William Shakespeare each are trustees of evolutionary achievement. In their own souls will be kept the record of the future also. While the race, although advancing in average achievement, has as such no memoriter except the perishable records of books, and such philological and archæological relics as become logical at all only in the mind of the individual.

The question therefore becomes this, whether that individual has been reached which can forever adapt himself to new and wider environments, and to whom the universe, whatever its unfoldings may be, shall be only food forever. Is man the individual that should come, or look we for another? Is man what Nature seeks and ever has sought? If we interpret Nature as ethical, then the ethical man is what Nature desired, and in whom she finds her supreme expression of progress.

In further answering this question, I have only to point you to the unlimited unfoldment of truth that in this age of science has turned the physical universe into a vast library. One stands overwhelmed by the extent of the transformation that has gone on in earth, air, and sea—yea, in remote universes—and even beyond all vision, beyond all hope of future vision, where the mind has pierced, and measured times, and calculated orbits. Or, if we turn to the familiar scenes about us, it is no exaggeration to say that leaves are problems and demonstrations; and pebbles and rocks and trees are no longer predominantly material objects, but are transformed into intellectual and moral food. Man is certainly that one thing needed and demanded for this exaltation and metamorphosis. Nor is any other required. The problems are here. They were here for ages. The being is now here that can solve them. The two factors are complementary—man and Nature. Neither is complete without the other; each is complete in the other.

But if Humboldt is really swept out as he begins to reap the joy of his destined work, then man is not complete, but a cheated victim. Hope is roused; ambition is flattered; achievement permitted: but the cup is dashed from his hand as it touches his lip. Nature is transformed, but man is dashed aside in doing his work. It is the race only that is permitted to exist, but the race will ere long end in a cyclic chaos. This is the dilemma: either Gladstone, Darwin, Homer, Milton, our poets, our saints, cast into a remorseless mill of fate, the import and purport of their existence to be ultimately obliterated, or man is he that was sought for by evolution. Nay, more, if man perish, there has been no searching—no purpose, no desire, no ethical aim —no hunger for rightness; we have read the whole story wrong: what seemed to be a magnificent unfolding and progressive revelation of intelligent purpose was only a soulless trend of fateful atoms and forces. The end is not a Supreme Love, gloriously apparent and operative in the rhythm of ascending evolution: the end is nothing; it is chaos. Whence, then, came our dreams embodied in sweet words, our hopes embodied in generous actions, our aims, our purposes for the noble and better?

§ 2. *Man reaches Relations with the Infinite Purpose.*

I have so far shown that the end of Nature, being ethical, is fulfilled in the production of the ethical being, and that man fulfills the demands of eternal purpose in evolution; furthermore, it must be man as an individual rather than as a consecution of passing individuals. I have also shown that man in his individual capacity complements and completes Nature as Ethico-intelligent Purpose.

I intend now to show that man as individual attains, in the process of evolution, personal purposive relations to the Supreme Purpose, which relations constitute the basis of perpetuated individuality.

By previous lectures we have found heredity to be the grapple of sentient purpose with material environment, producing that orderly arrangement which constitutes life. Heredity as organic increases its influence—never confirmed, but always confirming. Hence, evolution is forever a struggle—a struggle of life to live. The complex animal structure has at last a mighty inheritance of established order—a heredity of purpose. It is sentience on the road. It becomes con-sentience. Consciousness and conscience, as we have seen, rise to self-consciousness; which in turn ultimates in Consciousness of Self Higher than Ourselves. By consciousness I have carefully defined that I do not mean a condition of intuitive knowledge, although it involves a degree of intuition, but a synthesis of facts amounting to direct scientific and logical demonstration. Consciousness of the Higher Self or Infinite Self is a necessary conclusion from the accumulation of cosmical data. This consciousness of self, rising to a consciousness of Supreme Self, differentiates itself into an intellectual conviction and a moral obligation—consciousness and conscience. We recognize ourselves, on the same sentient basis, to be involved in the intelligent order of the universe, and in the moral right of the universe. This establishes man as an ethico-intellectual factor and product of evolution; and, as such, bearing relations of the most intimate sort with the Supreme Ethico-Intellectual Purpose—the One who is God. This relation is wholly out of the range of relations in which we find all creatures below man.

Does this new relation involve any differentiation of man's higher powers that will enable him to escape the process of self-surrender? Does it involve a breach with organic heredity of a nature that, while passing the elemental body over to the action of physical forces, drafts off, to fulfill higher relations, a substantial self of a spiritual sort? There is nothing in Nature that renders this a monstrous supposition, for evolution has at more than one point established a new order of relations, involving consequences quite as astounding.

The first unfolding of the universal cosmos into life, the beginning of a series of organic differentiations, was a leap from or break with the precedent; so, again, when consciousness rose to self-consciousness, and the objective creation became subjective, Nature established a new order, a total revolution in evolution. There is therefore nothing novel or without precedent in the supposition that man should break from the law of animal heredity by establishing cosmical and microcosmical relations. Certain it is that man has reached a stage where the increase of conscious relationship is out of all proportion to substance and energy. Whatever view may be held of direct inspiration from Supreme Life, we know this, that the universe exists, for the ethico-intellectual being, mainly as inspiration —food for consciousness, and not merely as food for the body. A tree or a star, besides its relation to our physical well-being, bears a vastly fuller relation to our conscious intellectuality. We stand before God. This new power did not come up to us by inheritance; it is purely an attainment. Life under special moral conditions attains what it does not receive. This new relation depends on our own choice, our moral, free purpose. It is the result of enlarged environments, acted upon subjectively by us. To live has become a matter of moral choice; it is not only to exist, but to control the ends of our existence. Man is more than an organism; he is character.

Note in passing that man recognizes a distinction in men that in no case is recognized below men. Men are divided by all common conception into the two classes of moral and immoral men. On this basis rises the religious distinction of the saved and lost. Those who adopt right principles are said to live; those who adopt wrong, as a principle, are said to die. Salvation is becoming good. What does all this mean but a human consciousness that life in the ethical sphere is a new thing under new laws? He increases life, broadens, deepens, exalts, intensifies life, who lives rightly; but the wages of sin is death. This is true not only of the body but of the selfhood—the moral, substantial self. Add that this living power is recognized as some way coincident with a knowledge of the Self-that-is-higher-than-ourselves. To know God is life eternal. In this way we cease to be the self that is, and become the Self-that-is-higher-than-ourselves. It is then the fact that man is life and sentience so exalted as to face and behold the Supreme Self that makes him savable; and he is imperishable as a self only as he becomes a son of God, a child of the All-Life. In Him we live and hold our being. The gift of God is eternal life.

Notwithstanding the sad entanglement of this truth with degrading mechanical follies—efforts to save ourselves by pacifications and atonements—the great fact stands true that we are born anew as we open our voluntary souls to the tide of universal honor and love; and we are in no way separable from the animals if we do not. However easy it may be to bury this idea of a new birth in a slough of formalisms, yet it remains the greatest of all truths, and constitutes a veritable item of evolution. "Marvel not that I say unto you, ye must be born again."

The new relation established by the self-conscious, ethico-intellectual man reaches, or may reach, absolute identification with the Self-that-is-higher-than-ourselves. Life begins with a dual unity. There is the two-fold at the outset in the organic and inorganic unfoldings of Nature; again in the vegetable and animal development of life. These divergences ever also converge, as I showed you in the lecture on co-operation in evolution; and it is in both the divergence and convergence that a perfect union is established. Later still arose the two-fold in sex, wherein self involves the other self, and neither self is self-fulfilling except in the other. Society has for its unit the family which arises from this dual unity of husband and wife. This new exaltation of the human individual is a recognition of the same fundamental unity in duality; for in it the Supreme Purpose meets himself in the Finite Self. The ethical life is no more nor less than a life where the one is in All, and the All is in one: "I in Him, and He in me." The longer it continues, the stronger its development, the more this unity is established. I become identified in will and purposing with the Purpose—the One, the All, the Life, the All in All. The subtlest, most ethical, and ennobling of all philosophies stood in the full light of this conception—I mean the Græco-Christian, as we find it in the Gospel according to John.

But, dropping the language of philosophy altogether, and even that of accepted Christian theology, we may say in simplest terms that man has attained by moral choice, under the influence of cosmical data, a position in which it is plainly required of him to co-operate with God—to assist to the utmost in himself and of himself, to sustain and work out moral principle—and he recognizes this obligation as universal, belonging to him at all times, under all circumstances; and to all other human beings. This requirement he does not recognize as belonging to any other creature than man.

This absolute break with the past, bringing me into relations of intimate union with the Purpose in all life, does not, however, imply in any degree the yielding or weakening of my own individuality. Allied to and identified with Necessary Being, I am not the victim of forces that break up in me the tide of heredity. I am by this rise and unfoldment of relations not less, but more. I am, as purposive, not merged in God; for I have all the past of phenomenal life in me, reintegrating in me, as heredity or substantial self. I have an enormous, originating, purposive spontaneity, in no way controlled by alien or by allied influences; that is, I have eternity in me, and it is in myself, as myself, that the Supreme Self meets me. Understand that there is no perfect unity secured by the absorption of the many in the one, but only by the co-operation of the many as one.

The new relation reached by man, and by man only, is one that enables the Purpose that has always worked out its aim and desire by a succession of organic changes, achieving a steady rise toward the ethical, henceforth to achieve, far more readily, ethical aims in and by means of the individual ethical man. In us dwells the manifesting force of highest evolution. To become thus one with the purpose and intent of the universe, is to become one with vital being in a grand, co-operative, necessary unity. "That they all may be one, even as Thou, Father, art in me, and I in Thee, that they also may be one in us."

Life as phenomena can not be continuous, but as purposive self identified with the One Purpose it involves continuity of phenomenal states.

The monera does not escape death by becoming a vertebrate, or a biped, or with the attainment of language, or of letters, or of art, but by voluntary choice, identifying his purposive power with the Eternal Purpose. To return to the happiest of all phrases, he is "born again" of his own choice. Degenerate choice moves down and out. It attains no continuous power of self-renewal or re-birth. Life which is evil in intent can not be perpetual. The All-Life is activity of a moral, aggressive sort. Life can be life only as ethical or right tendency. Degeneration is the voluntary yielding of the living functions; it is to forego our relations with God ; it is lapsing to lower forms of functioning. Regeneration is moral re-birth on the line of life, more life, larger life. Degeneration is re-birth on the line of animal and narrowing conditions. The only achievement of the ethical is progressive increase of the higher forms of living. It points from the re-birth of the soul in its own realm of choice to re-birth in physical relationship to the universe.

The Oriental religions failed in not grasping anything as possible beyond repeating man. But continuity as attained by union with God involves a rise in states of being. We must for once and all give up the idea that any future state of being can be the present state renewed or repeated or resurrected from rest or sleep. It can only be a succession of new stages of existence. Evolution must go on, evolution of moral purposing, evolution of the Purpose ; but *in* us, and in our enlarged relations, rather than by a succession of individuals. If we continue forever, it must be not as abstracted or separated from Nature, but as Nature itself exalted. In us must be secured the property of perpetual change and re-adjustment by our own wills, so that by voluntary obedience the Supreme Purpose shall become progressive in us. So shall eternal, progressive re-adjustment in no wise end in us, but be carried forward in ourselves and by ourselves. Can we conform to and embody the laws of eternal life ?

Hid unfortunately, and in most cases wholly lost sight of, yet everywhere, in all religions, there lies this great truth, that somehow the perpetuity of our property in ourselves, the saving of our souls, or life, depends on moral obedience ; on establishing in ourselves the law of moral evolution as a working and controlling force. This has been overborne and concealed by efforts at substituting all sorts of ceremonies, emptinesses, worships, in the place of law.

I wish to make this argument clear and distinct, that by becoming ethical beings, consciously purposing to ethical ends, we are in purpose, will, tendency, aim, and end one with, and working with the Self that has purposed in all evolution to ethical ends. Our life is in His life, and His life is in us; we are partakers in so far of the Absolute and Self-Determinative.

But, having fairly found in man a substantial and ethical power for eternal self-adjustment to moral living, we have in turn to consider the relation of the moral infinite to us. If man has attained a possible eternal ought toward God, has not God the same ought in his relation to man? As we become consciously one with the All Moral, or Moral All, have we not claims precisely in proportion to our moral worth? It can not be otherwise. We are a part of the moral causation. Are we worth preserving? Then God ought to preserve us. Are we working as one with God toward universal meliorism? Then we are worth the keeping.

The Purpose in all evolution owes it to himself, having secured a purposive result that can carry on his distinctive purpose, to sustain the same. In other words, God is bound to himself not to destroy that which is essential in fulfilling the ethical aim at which he eternally works. Furthermore, he owes it to man, as a self-conscious co-operator and ally, as having entered freely and determinatively into his ethical purposing, to sustain him as his child. Nor can we establish any conception of ethics that will allow of the contrary. We are bound to Him and He to us by an integral substantial oneness; by singleness of aim. Through us the divinest ends of the divine become apparent. No Christos is possible but in man. In will, in work, and consequently in joy, we are one with the Ethical One. We can not be dissevered. Sowing together, we reap together. The inalienable rights of the child lie where the inalienable rights of the Father lie.

The believer in a creation by an extra-natural Power also lays stress on the goodness of God as a fair ground for expecting immortality—it is one of His gifts. But this argument he promptly weakens by the more general statement that God, being Absolute, has created for his own glory, and that in so doing he has not considered the desires or purposes of his creatures. This position he again checks with the assumption that divine wisdom will not permit the Creator to make such marvelous beings as men, and then, as fast as made, destroy them. And this certainly is a sound conclusion from his standpoint. But he once more is met by the question, How do I know that God can make an immortal man? Is it not in the nature of a thing that is endowed to use up its endowment in time? He then imagines the next life to be a re-endowment. This involves a resurrection from the grave and a renewal of the old; after which men are taken from a changeable world to an unchangeable. So, by a trick of transference, we escape death.

At this point the believers divide, one party asserting that God gives eternal life only to the righteous, the other party affirming that all receive it. Here the first party, as you see, introduces for the first time a natural element: God gives to the good by means of their goodness, or obedience. This is only a step from the statement that eternal life depends on obedience to such laws as prolong life and prevent disintegration. The main party of the orthodox denounce this conception as heresy; yet they are themselves compelled to finally rest themselves in hope, and confess their doubts. The real fear of losing life is, however, mainly absorbed in the more awful fear, born not of conscience, but a lack of conscience, that God will arbitrarily shut them forever in hell. .Only a lack of moral nature could conceive such a brutal right, and only a lack of con-science dare to associate it with goodness. This panorama, however, fills up the view of the vast majority; and now their problem is shifted, for they must conceive God as eternally giving life to the damned, while as eternally his endowment is being exhausted in their dying. Meanwhile higher souls, rising above a practical conviction of their own creed, mentally and morally, themselves being higher than their doctrines, are left in a condition of pure hope. Faith they can not have, because their faith is in a God and a moral system beneath them. They can not trust a Being who has failed to accomplish what he purposed in creation. Practically, faith in God is given up by a large part of those still in the churches. They hope that after all, somehow, there is immortality.

The utterly unsettled and pitifully sad condition of intellectual people of this sort is seen in the fact that they are willing to consider the verses of Tennyson as being an acceptable expression of their present hope. Probably this is true; and Christendom can give us no higher, no surer proof of immortality, and has no stronger convictions than those in "In Memoriam":

Oh, yet we trust that, somehow, good
  Will be the final goal of ill;
  To pangs of Nature, sins of will,
Defects of doubt, and taints of blood;

That nothing walks with aimless feet;
  That not one life shall be destroyed,
  Or cast as rubbish on the void,
When God hath made the pile complete.

Behold, we know not any thing,
  I can but trust that good shall fall
  At last—far off—at last to all,
And every winter change to spring.

Are God and Nature, then, at strife,
  That Nature lends such evil dreams,
  So careful of the type, she seems,
So careless of the single life?

I stretch lame hands of faith, and grope,
  And gather dust, and chaff, and call
  To what I fèel is Lord of all,
And faintly trust the larger hope.

. . . And he, shall he;

Man! her last work! who seemed so fair,
Such splendid purpose in his eyes;
Who rolled the psalm to wintry skies;
Who built him fanes of fruitless prayer;

Who trusted God was love indeed,
And Love creation's final law,
Though Nature, red in tooth and claw,
With ravin shrieked against his creed;

Who loved, who suffered countless ills,
Who battled for the True, the Just,
Be blown about the desert dust?
Or sealed within the iron hills?

O life! as futile, then, as frail,
O for thy *voice*, to soothe and bless!
What hope of answer and redress
Behind the veil! behind the veil!

"These noble and solemn lines describe what is the real attitude of most of the thinking and earnest minds of the present generation." So says a writer of high rank on modern science and modern thought.

Not by him only, but by religious writers generally, these verses are quoted as if they contained vast consolation, and really some final settlement of the problem. They are, in fact, the mere proof of supreme doubts and dissatisfaction. Besides, they are a jumble of appeal to God and to Nature, as to forces alien and separate, without any certain confidence in either. I know no severer arraignment of the failure of creationism than the utter inability of the believers in an Absolute Maker to convince themselves that his glory can include their existence, after a brief display of his ability to create them.

Evolution answers that the end and purpose of lower life is palpably fulfilled when it becomes the step to higher forms of life. Nothing that is reaching toward, and helping toward, an ethical condition "walks with aimless feet."

But, when man and ethics are reached, the aim, the end, the purpose, can not be achieved by destroying what is accomplished—beyond which is no higher.

Evolution has at least not to deal with a great extra-natural Being, whose purposes we can only guess at in Nature, and fear he has other purposes of a supernatural sort that we can not unriddle. We have only to deal with Nature and natural processes; and, if we can not speak positively of the future, there is no longer a complication of issues thrust in that makes it impossible to lie down peacefully in the same arms of eternity from which we rose, saying, "I have finished my work, I have done what life gave me to do, and done it honestly." Here pure atheism, closing our eyes forever, is preferable to the pitiful cry that bemoans our lot as naturally lost and rightfully cast away, yet sings a forlorn hope into Heaven, as a special grace of an arbitrary, extra-natural Power.

We are not in the least degree beings made or unmade by any power, of which we are ourselves not a part. Our relation to God is that of natural phenomena of infinite life. We know no reason for supposing universal law is ever subverted by an emotion of a god.

The argument as it stands I sum up as follows: Man is a process in the evolution of being that rises from mere consciousness to a consciousness of himself as having moral obligation and intellectual duties. From this standpoint man obtains a concept of Being that is eternal, necessary, absolute, moral being; and of the relation of himself to such Being, as having with Him a unity of purpose, and unity of causative will, and unity of the involved consequence—that is, moral Joy. He therefore logically and lovingly expresses this relation in Father and child. Evolution henceforth becomes the unfolding of the ties involved in the new relation attained and secured by ethical man. On the side of man, to succeed is life, to fail is moral degeneration. On the part of God, the obligation is to meet every moral uplook of his child with sustenance. The evolution of purpose which heretofore went forward by securing a gain of heredity in a succession of organic changes, reaching continuously toward order, beauty, and truth, now goes on by means of the personal union and interrelation of the attained moral being and the attainer—man and God. No conceivable rise can be hereafter secured by organic multiplication, unaccompanied by the already secured moral power in man. By the union of our purposive will with the causation that ends in ethical goodness, we are identified therewith in aim, in power, in destiny. We live because he lives in us. Nor is there any manifest power in Nature apart from our own wills that can sever this unification, and separate us from the Father : "Neither death, nor life, nor angels, nor principalities, nor powers, nor things present, nor things to come."

We rest in the clear conviction that the ultimate of evolution is the dual Oneness of the Finite and the Infinite —the Father and the Son. Is the relation thus established of child and parent not also a moral union involving all moral rights? Morally there is a relation of mutual service and love established between myself and The Life. Morality is that result which comes from relations of such co-operation. One alone can not be a moral being. Between two there can be morals. Were the universe but a One, it could have no altruism, no end but self ; it would be not immoral, but non-moral. The evolution of All-Life into living individuals is a passage toward morals as it is toward rationality.

§ 3. *Man an Incompleted Purpose.*

We must now give due weight to a demonstrative fact in human nature, which can not easily be overestimated. The conviction of immortal life rests in thinking minds, where emotionally it rests in all minds, largely on the fact that in the present stage of being we do not fulfill, or fill-full, our inherent purpose: the destiny wrapped up and necessarily involved in our relations to the universe. There is a sense and deep conviction of incompleteness, which invests our ethical and intellectual career.

This is wholly a different problem from that of the fulfillment of organic functions of a physical sort. These latter become in the ethical career wholly secondary. We eat and live bodily in order to serve the ethical self. The physical organs may exhaust themselves, and the psychical be as yet consciously only at the threshold of conceived possibilities. What then? Have we not come upon another differentiation veritable and logical? All the way along the line of evolution we have found this differencing of functional action—the one universe became organic and inorganic; the one life became vegetable and animal; the one sentience became consciousness and conscience. The substantial Self becomes fairly that which, while constituting one, yet is a dual unity. There is no universal error and false sight in humanity when it recognizes man as body and soul. This is not, as the creationist holds, an absolute duality, but an absolute unity. For we have seen before that no real unity ever subsists but on the basis of duality. We can not look in on ourselves in self-consciousness without recognizing a differentiation that has taken place germinally in our substantial animal heredity. Whatever we were, we are now become a two-fold personality. All languages, of all men, in all times, confirm the universality of this conception that we ourselves are identifiable as psyche and physicus. The physical we recognize as that part of animal heredity that must be surrendered; the psychical only are the incomplete functions.

Having now assumed the responsibility of evolution, the psyche recognizes its work as only begun in this life. If a man were as yet purely animal, he could lie down content to die when the body becomes exhausted. But as a psychical being he is appalled with the thought of stopping. The higher intellectual and moral functional power has hardly begun its career. The universe lies open before the man, and lo! he perishes. The act of dying physically in maturity is a delight; it is as psychical beings that we suffer in the grapple with death. If man be not immortal, there is an astounding condition of things in Nature. It is not so much that these brittle organisms shall fail to endure the necessity of adaptation to environments, but that fitnesses of a high ethico-intellectual sort shall be tossed about as valueless. Milton and Washington are tumbled into the heap of *débris* with gladiators and clowns.

Nor is it a mere question of incompleteness in time, but of completeness in quality, and still more of progressive completeness. There are mere flashes, occasionally hours, when a man learns how much more he *is* than he attains or exemplifies. A rare occasion shows him that he is possessed of heroic possibilities, or of latent intellectual powers, of which he had not before been aware. Are these powers and possibilities a purposing in Nature that must fail utterly? Is the only light of the human soul like the play of electricity along the horizon?

No one who has considered his dreams can fail to recall that no moment of ecstasy in his waking hours ever equaled the pure bliss that is possible in dreams. I have myself realized on two or three occasions that there is in friendship a perfect joy possible, a glowing and calm peace, pure, chaste, and self-sustained, that I never reached in waking hours. This association proves that the soul is possessed of emotional powers, or that emotional states are possible, far richer than life realizes. In these cases the reaction upon the body was delightful beyond expression, and, after waking, the whole system rested for a while in a state where the psychical seemed to be so wholly in control that for the first time the body was under, and yet possessed of the full rhythm and sweetness of the psyche.

Now, I am convinced from evolution that we are yet living a low phase of life; that, however, we have reached that stage where the will has become a factor in evolution to determine existence. Our to-morrows are more beautiful by our purposes. We come to re-births frequently, or occasionally, when the soul-life transforms the physical life; and we can see that Psyche is stronger than Physicus. Future evolution is no longer a question of physical evolution; it is whether we can personally assert a more purely psychical condition. Conceive what Nature has to do in this line. Benjamin Franklin said: "We are not yet born." This is an embryo-life. What will Nature find to be the possibilities ahead of such a psyche as Franklin? Rid Daniel Webster of a few physical weights, and he becomes of necessity a being so much grander than our Daniel Webster that the philippics of Wendell Phillips might be erased by the golden pen of the most magnificent of them all, Phillips himself. No! it is an ethical question. Are we so living that the psyche shall place us in the line of continued evolution, or personally do we drop out by degeneration? No more contemptible trash comes from human mouth than the claim of a beastly nature to belong to a range of life more perpetual than that of the beasts! Yet there are uncounted numbers who lack the environments to bring them to their *best*, and who, with occasional longing, submit to the temporary conditions. To these, conscious of possibilities of character ineffably nobler than they daily realize, the next life opens so full of promise that they may indulge in no dreams of it too extravagant. Take one whose heredity has been, by the error of a mother, stamped with grossness. Environments of pure sisters and honorable associates do much to recast or save him; but the heredity demands that the environments shall not include the flesh and the fleshly appetites. I can conceive many such struggling through life, and at last delivered.

But you have still to gather the full meaning of man's present condition, and relation to morality and verities;

this uneasy craving, and sense of utterly unfinished purposes, so far as the present life is concerned. For these yearnings constitute more than a desire or conviction of continuity; they constitute furthermore an actual tendency toward a continuous evolution of higher spiritual integral powers—a drift, a direction of energy, that will help to define the future of evolution. A spiritual or ethical period has been completed in the creation of a being whose innate needs point toward future stages of being. Immortality is thus the prophecy involved in the moral making of man. Man himself stands so related, so faced, so inherently tending, as to constitute in himself a readable prophecy—not of perpetuity as he is or may be in the present life, but of higher states of being under better environments. He constitutes a positive and forceful bias of evolution in that direction and to that end. Evolution can not stop at man as he is. It is a process not only through an eternal past but through an eternal future; and the future ever will be, as the past ever has been, determined by the ethico-intelligent aim embodied in the process. Man constitutes a factor of this aim or purpose, an element of the determinative tendency of the future.

Furthermore, man is morally adjusted for eternal growth. Food for perpetual moral and intellectual evolution is stored up. The universe is altogether in every atom of it convertible into food for ethical beings. Life in lower creatures was a desire; it is in man a duty. To save your life is the sum of duty, but it is supremely to save that life which we designate as the soul—the differentiated ethical life. All functions of living become sacred. Man is exalted to a fixed, irresistible demand for moral and intellectual ministering, and the universe is transformed into moral and intellectual pabulum. It remains to the will of the individual to go on, or to degenerate.

The relation, then, which we found of man to the Universal Purpose, and of the Universal Purpose to man, exists also between man and the material universe and the material universe and man. Man finds his completeness in the Father; God can not be divinely good except in man; so man finds himself only in eternally unfolding relations to the universe, and the universe can be correlated into high purport only in relations to man. There is no poem in a star apart from a soul. The sciences are never born out of the air and the rocks until the psyche conceives them. There is incompleteness everywhere except in the ever warmer, ever larger, evermore apprehensible relation of the ethical individual to God and the universe.

Here it may be said that all arguments converge: 1. The aim of evolution, being ethical, is fulfilled in man as ethical; in the individual, and not the consecution of individuals. 2. Man reaches identity with the Purpose of Evolution; becomes himself, as part of the purpose of Nature, self-determinative; which involves a mutual obligation, wherein the Supreme Purpose is bound to sustain and fulfill the rational and ethical end of a human being. 3. Man is, as ethical, incomplete, and ever must be incomplete; and moral evolution can be carried forward only on the line of perfecting him. 4. In his own forceful purposing man constitutes a bias in evolution toward individual continuity, being himself a factor in determining what future evolution shall be. 5. In all which, not only is man faced in hope and intent toward immortal life, but at each stage of the argument we find the universe adjusted and re-adjusted to fulfill this purpose. Man and Nature become complementary, finding their reason to be each in the other. Only as ethico-intelligent man exists, is there meaning in the universe as ethical food. So also are man and God, as moral intelligence, complementary, finding each in the other the fulfilling of self, the reason for being as they are —this complementary relation closes up in the idea Father and son. 6. The secret of immortal life lies not in our animal heredity, but in our heredity of the Eternal Purpose, coming to fulfillment as ethical, in us as ethical; and henceforth bearing us on as itself. He that wills with the Supreme Right is saved from degeneration, which is the only death. Whoever rises to cheerful and loving purposive union with God comes thereby to a second birth—to a life that the decay of the body does not control, but in due time aids to higher adjustment.

§ 4. *Re-adjustments demanded by Evolution.*

Physical re-adjustment, proportionate to ethical and intellectual conditions, becomes, therefore, an absolute requirement—not a thing to be feared. For, while it is true that as ethical we have reached beyond the physical and structural relations that we receive out of the animal world, we must in time break free from the physical bonds that hold us still in the line of purely animal structural descent.

There is no definition of life that does not involve the power to change. Only the permanent, the enduring, changes. Heredity, become absolute, would soon end in dissolution. Immortality must, therefore, be conceived as beginning in this life. The possibilities of the ethical self are infinite, but its sense relations are very limited. The character of the universe about me depends on my ethical self; so also death. As a being of ethical power, I create. Nothing can create or destroy me but myself. I create death.

From this standpoint death is neither terrible nor unnatural, but is a part of the process of living; for life is not reached but in the freedom of change, and at points of transformation. In Nature there is no absolute death, only re-adjustment. Such dying is only part of a perfect life-process. The only death recognized by evolution is a moral factor—a determination downward, a degradation of purpose, leading to degeneration. But to a right soul, with right purposing, the only possible change is into higher relations; and holy purposing inevitably must tend toward higher organic conditions. We, like all other beings, come within the terms of causation. There is no hap or chance. Stability, or equilibrium, would remove us from the consecution of cause and effect; we should drop out of the line of interlinked sequences, and so from all reckoning—a state which, if conceivable, would still leave us unstable, for not even the law of cause and effect would define us or relate us. Therefore, all stages, forms, and terms of finite being involve re-adjustment of the inner to the outer; that is, of heredity to environment. Our physical change is both continuous and periodical. The organism of this present life is an adaptation of present psychical ends to the material world. This can not be a permanent adjustment. Any possible continuity of existence must readjust us to cyclic changes. No continuity of state, but continuity of being, is demonstrable.

We shall easily fail to recognize the law of periodicity in evolution. It is discoverable, however, in all directions. It is a law, as we have seen, governing historic progress. It is seen in the metamorphosis of insect life, in the embryonic changes of man, in the long history which has carried organic life through not any uniform development, but through periods of progress constituting the four great stages, protozoic, molluscous, articulate, vertebrate. The same law is seen in our individual waste and repair, for our lives are divided functionally into youth, manhood, and age, and every day as well as every year carries us through periods and cycles. All progressive change hangs on this periodicity; our round three-score years and ten is a natural period. Death inherently means only development.

Physical decay and death in evolution is therefore not an evil. It never has been an evil. It can not be an evil. It is a part of meliorism and progress. Ethical existence requires a change of physical adjustments quite as much as the worm that moves toward a butterfly; or an aquatic animal that moves out to land-life. Immortality being a struggle to be ethical is a purposive and constructive or reconstructive effort. It molds over and carves anew our features. It ennobles the relations and uses of the body. It widens and expands living. The law of hunger is transformed—we live for ourselves by living for others. Our life is re-begotten into the neighbor and into the God-life. We are born again. The flesh-life does not keep pace, therefore re-adjustment is natural and requisite.

We thus escape the terrors of that immortality which is offered us by the creation hypothesis. For that can consist only in the monstrous and terrible drama of resurrections, judgments, and finalities. Those finalities are heaven and hell of a character quite the same as belong to our flesh-existence. We are to renew ourselves, our old lives, and move on forever in an unescapable monotony of bliss, or a perpetuity of misery and blunders. Such a heaven, if it were possible, is essentially the drafted-off selfishness ; and such a hell, the drafted-off grief of present existence. Two states, weakness and strength, complementary to each other, and in each other finding relief, are thus separated to the total extinction of all possible right, and duty, and honor, and love, and content. Heaven wofully needs hell, and hell as wofully needs heaven. Nothing can be more dreadful than eternal alienation from the good, unless it be eternal alienation from the evil. This is the immortality of Dualism. It collapses in selfishness above and beastliness below. It makes as wretched a failure of the next life as of this. Evolution denies the possibility of such continuity altogether. This life is a picture, a phase of one great eternal truth, that all things are complementary. Perfection is only approachable, and it is approachable only through better adjustments, and not through reiterations of the old. No one of us will ever be quite saintly, as no one ever was quite devilish.

§ 5. *Is the Finality Moral Automatism?*

But at this point we reach perhaps the most vital question that underlies the concept of immortality. Physical re-adjustment, or less properly speaking death, we shall agree is a necessary item in immortal life. Is moral re-adjustment also a necessity ? Here we find a strange agreement among religions. Buddha assures us that the end will be perfect moral union, as well as physical, with the Supreme ; and the end logically Nirvana. The Christian assures us we shall be made perfect, and the end is Eternal Rest. Herbert Spencer, escaping for once from the directive logic of evolution, assures us that the end is to be moral completion ; wherein we shall instinctively be right without exercise of moral choice.

Our main concern is with the answer given by Mr. Spencer, although in truth the three answers are one, and they all may be summed up in the phrase moral automatism. It is all-important to consider whether evolution is carrying us forward into a condition of automatic completeness. We have seen how the whole vegetable kingdom, after diverging from the animal, moved through sentience and ultimated in an absolutely automatic process of growth and decay. The animal world largely followed the same path, completing its conscious career in instinct. The insect world illustrates the automatism into which life has settled ; it is nirvana, rest, completeness. When we study ourselves, we are amazed to observe how large a part of our functional action is now become automatic or instinctive. Nature has finished to her satisfaction the larger part of our mechanism. But the storage in the brain of pure protoplasm seems to be a provision of Nature against any entire lapse from conscious intent and work. Could a vegetable have secured a brain, it could never have wholly lapsed into mechanical automatism. In the brain of man lies a self-conscious determination toward new environments and wider adjustments.

But the question now is, Can there be, under the circumstances, any completed moral state, and intellectual, while life still moves in its rhythmic periods? There certainly is a tendency in that direction. The workers in a Swiss watch-factory, educated to do one thing and that only, do it perfectly—do it as machines do work, without conscious attention. This passes into heredity, and children are born with finished adaptations, or nearly so, to a specific work. Individuals, classes, races, may thus become human machines. The Bushman stopped conscious action of an intellectual sort before the ostrich. He can not count as well as a crow.

Consider man ethically. There is no question but that here also there is a movement toward a vast accretion of instinct. Take an illustration in every-day life. Parental altruism, or love of offspring, is the supplement of physical altruism. The mother has little to do with the growth of the embryo, of a conscious sort. Her positive love is equally an instinct: 1. There is the physical sacrifice in begetting—largely instinctive. 2. The maternal power to nourish with milk—an unconscious action. 3. Her love for babes—a powerful female instinct. 4. The impulse to protect and shield is largely a parental instinct. 5. There is the instinct to accumulate for children at expense of self. This is a civilized instinct that has lost its altruistic nobility; for, while it is a moral deed for a bee to accumulate for the hive, nearly all the laying up of property for children is a curse to the children, and known to be such. Without offspring, self-dissatisfaction is keenly felt; a part of the instinctive functions of selfhood are never fulfilled; there is an organic failure that is instinctively felt. The bachelor and maid may live, in conscious relations to others, a large and true life, yet, failing of the use of these unconscious powers, they are dissatisfied. The same is true of all childless people. So a certain amount of our ethical power passes down into automatism; we love children because we are unconsciously compelled to do it. There is no virtue in it, nor any conscious effort. Can not all our love in all relations pass in the same way into instinct, and so we be finished, and progress ended? Have we not already a large range of moral intuitions that correspond to physical instincts? That is, we have an intuition to honor parents, to be patriotic, to even die for our country. Herbert Spencer says: "The sense of duty is transitory, and will diminish as fast as moralization increases. Even now progress toward the implied ultimate state is traceable. The truly honest man is not only without thought of legal or religious compulsion, when he discharges an equitable claim, but he is without thought of self-compulsion. He does the right thing with a simple feeling of satisfaction in doing it. The moral sentiments will guide men spontaneously," etc. This does not seem to have suggested itself to Mr. Spencer as an absolute lapse into moral automatism, with nothing left except satisfaction. The highest condition of a human being, by such a conception—the condition toward which evolution carries us, is one in which choice and reason will disappear in a fixedness of instinctive right-doing! That is, our adjustment to Nature will be complete; we shall have obtained that instinctive moral goodness that excludes all battle between right and wrong, and finally all choice. We are adjusted to do the right thing, and therefore do it. The whole force of the soul will flow so irresistibly in one direction that the presentation to it of an opposite motive will be impossible; or, as the preacher would say, the man is beyond temptation. This was certainly not the condition of Jesus and our highest moral heroes. It is certainly not a condition to be desired. The perfect organic condition I showed in a previous lecture to be undesirable. The perfected moral state is equally to be dreaded. Ethical character no longer attaches itself to instinct. It is right or wrong for me to indulge in appetite, because there is choice in the case. It is not right or wrong for my stomach to give up work or gorge itself, for it has no choice. The ethical is ethical precisely in ratio to the free will and the power of choice.

But is Mr. Spencer not right so far as any given stage of evolution is concerned? It is undoubtedly a necessity that we shall pass all that we now do by severe action of will over to instinct and unconsciousness. But, at the same time, a being that has established permanent relations to the infinite passes ever on to higher moral conditions. This is true to-day. We are widening our moral environments. We no sooner pass over one duty to spontaneity than higher duties arise. This must always be true of one who is rising into higher relations to infinite life, that he still must rise. The hope of man is ability to adjust himself to new and wider environments forever. Eternity is not, if his, a repetition of the past. The next life consists morally of relations of a new degree. The moral functions that characterize this life will have passed into automatism. Does not this reveal a glimpse of the glory of immortal life? It is the history of a self that can never be overtaken and overwhelmed by perfection—can never be dropped into the unconscious. It is the pursuit of an ideal that ever eludes us, although ever approximated. We pass milestone after milestone of artistic conception, and never reach a limit of attainable beauty in art. We in like manner move out on all lines, and never ultimate at perfection. The love of the mother is, in its altruistic outlook, folding her sinning child and shielding her erring husband, vastly nobler than the affection of a child. The possible love no one knows, no one ever will know. The possible moral universe lies beyond the divinest outreach of evolution, in lives eternal. If it were a mere question of a heaven of bliss and peace undisturbed, serene, and free of care, then we should be compelled to say that humanity does not give us the elements for such a place.

Evolution, however, does not crowd us with any such problem. It simply asks us to consider ourselves as creatures on the road, and to see to it we do not sit down at the way-stations of habit and moral automatism. And it is not possible from any other standpoint to get a rational view of man's real character and possibilities. When Mr. Greg says, "I distinctly refuse to believe in inevitable evils," he is simply looking on man as a creature who wills his present condition so largely that the end may be absolute elimination of *evil.* Does evolution aim at this? Is this the end of development in any direction? Is not perfection as far off from the mammal as it was from the earlier vertebrates? Is it not as far off from the vertebrates as it was from the mollusks? Are not mollusks in some respects as mollusks more perfect than vertebrates as vertebrates? Are not monkeys as monkeys more perfect than men as men? Is it not the character of unconscious work that it is more exact than that which is conscious? Is it not true of instinct that it is more precise than reason? What, then, are we to make of Herbert Spencer's assertion that "there will exist beings whose individualities can be expanded to the full in all directions; and thus in the ultimate man perfect morality, perfect individuality, and perfect life be simultaneously realized"? This certainly pictures a state of man in which friction of choice is ended, the conflict of motive has ceased to clash in his brain, the will to overcome evil is no more—the man is a moral automaton. What do we seek for in our machinery? Certainly, no wild dream looks to the absolute abolishing of friction, but to the reduction of the waste of energy to a minimum. What is progress in mechanics? It is the accomplishment of the largest result in a given certain number of directions with the least waste of power and wear of machinery. The highly specialized human body is of the same sort; and intellectual action and moral are not unlike. There is wear, for he that would save his life must give it. There is waste of power, for the very effort implies the unworthy. There is, therefore, perfection for man only in imperfection. In evolution, that is the highest creature which can the longest approach its ideal and not reach it. Can man touch his ideal? Evidently not. He has already conceived the infinite—the infinitely good; and, being finite, he can evermore approach and never reach it. We have nothing to do with completeness and perfection, for that would be the end of us as men—the fate of those whose development is arrested by degenerative purposes.

This question it was necessary to discuss at some length, for the destiny involved in much of the religious desire of our day is no more nor less than annihilation of the moral power—a lapse into the necessitarian condition of a pear-tree which bears delicious fruit and can not help itself. Heaven is the fool's paradise of finished-up evolution!

No sound breaks the stillness of night as I write, except the clear notes of some genius of music, strolling by, whistling

"John Brown's body lies moldering in the grave,
But his soul goes marching on."

That song is the battle-cry of humanity, evolved out of a hundred centuries of selfishness; it is the voice of humanity triumphing not only over its dead self, but over death itself. It typifies more than this: that the soul of man is not only a product of evolution, but is itself, above all things, obedient to and dependent on eternally marching on.

In any discussion of eternal existence, we must never lose sight of the point that the real problem is whether man can go on with Nature, without limit; whether the evolution of life can be perpetually carried forward by and in him. For the moment he is perfect, and there is no more advance to be made by him there must be an evolution of a higher being, or manifestation of life. This we know by the determined movement upward until man was reached. One form after another was flung aside; one creature after another, until the human creature. We must keep man on the track of evolution, or give him up.

But anatomically Nature is apparently making no effort at any higher organism; she hardly spends due effort in improving that of man. Energy has been drafted off to the development of the intelligent and moral sort of living. Man is, as far as we can see, a finality in organism. Henceforth evolution is the exaltation of ethical states.

We are in the line of future evolution by our power of reproduction, and that force that wraps up the inheritance of all past life in the egg. But is this all of us, or the main part of us: reproduction? Are there not forces and tendencies in us that lie out of that line of life? Are we not lifted by ethical determinations, so that we also daily and hourly give new birth to ourselves? The ethical regeneration is not a begetting of others from ourselves, but begetting ourselves from ourselves. Here is a new method in evolution. It is not in the beast; it is a human power. Out of dead self we are born over to higher self. The new birth of Jesus and Buddha is of this sort: "Marvel not that I say, ye must be born again." "Good master, what must I do to inherit eternal life?" Jesus subtly answers, Sell your goods, and become charitable. What does he mean but that the man was living a perishable life of money-love? He must be born to a human love; started in the evolution of imperishable life.

And in this new birth of ourselves, unlike the reproduction which multiplies others, we intensify our hold on life. The higher our life is, the clearer, broader, stronger it is. Reproduction physically is at the expense of self; reproduction psychically is to the advantage of self.

Let this be clearly seen that by the ethical life the individual becomes a succession of individuals; generation goes on within him instead of by means of him; he begets himself anew; he becomes by re-births the equivalent of generations. That which in lower life required a succession of individuals, in him is accomplished by rising continuously from his dead selves to higher states of self.

§ 6. *Phenomenal Testimony.*

The argument which spiritualism has to offer neither conflicts at all with the evolution hypothesis, nor does it necessarily grow out of evolution. It is an appeal to direct testimony. It affirms that life does pass into other organic relations to the universe. I need not revert to my emphasized statement that we must not make the mistake of thinking of the body as anything except the organic result of certain life-functions. Life lies back of all organism; it flows on beyond any conceivable history of organisms; it is an eternal function of the universe. So also are Apprehension and Ethical Tendency. The spiritual philosophy claims that the individual life passes on, as such, into other relations and organic conditions that are even sensible, or that bear certain relations to the sensible. 1. Evolution does not show us to the contrary—it does not show us the intellectual power that we have evolved given over, transmitted, to any other organic keeping in the sensible world. 2. It does not show that life can not exist except in some relation to our senses. 3. This is not all. I think I have shown that evolution positively affirms the continuity of ethical relations which are in this life established between ourselves and the Great Heart of the universe; that between us exists the law of mutual obligation. Furthermore, the ethical life establishes a oneness of the child to the Father; if He lives, we live in Him.

If, then, by means of phenomena, such as are dealt with by spiritualism, there is any demonstration of a continuity of individual life, or rather evolution of individuality beyond death, the whole subject is passed over to science. The peculiarity of spiritualism is that it is investigation—very crude, most of it, and by untrained investigators; but, for all that, a sharp contrast to the religious method that, discountenancing all questioning, requires belief in a certain measure of the same conclusions.

Of this we are certain: that phenomena of a psychical sort are associated with physical dying, precisely such as we should expect if life were continuous, and what we call dying were crossing the threshold. When Dr. Lyman Beecher was dying, he saw what caused him to rouse not only from dying stupor, but from a mental stupidity of years, and to shout his joy. "Do you see Jesus?" asked a bystander. "No! no!" he replied. "All is swallowed up in God." Miss Cobbe has collected in "The Peak of Darien" several cases of this sort. But it is within the personal knowledge of almost all physicians and nurses that such startling phenomena appear. You may as well say that the first cry of an infant indicates no relation to a new phase of life, because it is uttered on the inner threshold of the womb. It is an absolute misapprehension of facts to assert that dying in the majority of cases, or even the large minority, appears to be a passing out of existence. The testimony is astonishingly the other way; and the exceptions are positively rare where there is not something to indicate a passage to a higher state of being. The collection of startling cases may have the effect to shadow the simpler testimony of the ordinary death-bed.

We have then to add to this by the testimony of spiritualism that this interaction of the sensible and extra-sensible universe is never wholly broken. I have no right to deny this. Yet we are never to lose sight of the fact that the phenomena of spiritism are universal in low races. They are, indeed, never absent from such peoples as live a strongly sensuous life. Whereas, a strongly intellectual life is not favorable to their perception, or to belief in their existence. Does this militate against their existence? I think not;

but, when to this we add that mediumistic natures are very largely of a similar class, it indicates that the association of the two lives, if it sensibly exists, exists for the most part between those, on either side, of a stoutly sensuous sort. It still remains possible for higher intellects to gather such testimony, reduce it to order, and evolve the laws that govern universal psychical relation.

I can not, however, help protesting against too much being allowed to depend on this argument of sense phenomena. The whole argument is a dangerous one. Stated in full it is this : Existence beyond the present life is demonstrable by the senses ; if it were not so demonstrable, it would not be credible. This latter side of the proposition is too often overlooked. It assumes too much for the senses. It affirms virtually that if we can not see a God, there is no God ; that the unseen exists only on the evidence of seeing ; that nothing can be demonstrated beyond the senses. Covertly, even to themselves, many of the noblest persons are held by this presumption. But the senses prove nothing beyond themselves. However, in the face of overwhelming testimony,

"... Dare I say!
No spirit ever broke the band,
That stays him from his native land,
Where first he walked when clasped in clay?"

Yet most emphatically we may all add :

"How pure in heart, and sound in head;
With what divine affection bold;
Should be the man who'd dare to hold
An hour's communion with the dead."

It is certainly a road of investigation open to serious danger, lest the sensuous character of the testimony mislead us to forget that any future existence must be an evolution out of and ahead of this life, and also lest we turn from one form of the debauchery of credulity only to fall into another.

This much already is demonstrable: that we do act at times, if not partially at all times, with personal mechanism that does not belong to the visible universe—that with which flesh and blood are associated, but from which they can be eliminated. The sensible universe and the spiritual are not, however, two and separate; but the one acts upon and flows into the other by insensible gradations, not as opposites, but as extremes of the One. Furthermore, we know that there is a constant dissipation of sentient energy from the visible into the invisible. It is more than probable that this is counterbalanced by a flow and absorption of energy from the spiritual or unsensed. But on no account must we learn to think of two universes as any way distinct, or existing otherwise than as the phases of the absolute Unity. The dual conception of the universe must be tolerated only as we tolerate the dual conception of man. Man is not a double or complex, composed of body and soul, but a substantial unit. The universe is not two-fold, but one. On no other ground must we build.

§ 7. *Conclusion.*

I have now given you what I believe to be the legitimate voice of evolution concerning the continuity of personal existence. There is no one thing to be deprecated more than the rousing in the popular mind of extravagant and false expectations. I doubt if the doctrine of immortality, as generally taught, has not been productive of more mischief than any other doctrine of a false creed. That which renders this life tame, despicable, a thing valueless, is precisely what we do not need, and which we can not too much regret. It is not religion, for it does not honor the noble, it does not worship the true and beautiful. It has no ideals but the unseen. Its skeptic is not the man who lacks faith in things, in man, in deeds, but he who lacks faith in ghosts and in rituals. When a wave of such skepticism flows over the world, and men doubt immortality, they see no value in living. The constant burden of this sickly religion is the evil of *this* life, and the hope of being transferred to another. The end of the world by all such theories is to come as an obliteration of life before the roar of the arctic storm of death ; the grating of the icebergs of doom toppling down upon the grave of hope ; and there ends forever all of human joy, except for those elected, by extra-natural power, to survive in a state of eternal moral inertia.

We can not overestimate the value of rational hope. Philosopher and hod carrier alike refuse to live over again the old life precisely as it was. Yet the pleasantest half of our past lives is in the memory. "Death," says Pliny, "is life's most delightful sensation." So also, and above all, the ethical yearning closes in on us with a desire for re-adjustment, for a "new life." The chrysalis no more surely efforts toward a change of environments than does man. If a wise God had made us, he would have done what Nature's infinite legality does, put death into the programme. It is to be clearly seen that this, all of this, is involved in evolution. Evolution is change, progress, renewal, reinvigoration by rest for renewed advance. The intellectual and ethical life is a sneer at us if it break down at death. Humboldt, were such the case, did well to rage in despair at losing all he had won.

"Life is an incompletion;
Only I discern
Infinite passion and pain
Of infinite hearts that yearn."

Tangled with all questions of our earthly career and with moral progress is this belief that we shall triumph over death. The Irishman in his most pitiful plight does not become a nihilist, because, however wretched his lot, he looks ahead with unwavering confidence to a better life. Such hope is essential to this life, precisely as faith in to-morrow is essential to a worthy living of to-day. A man clipped in his hope of eternal life is an eagle cropped in a goose-yard. To hope is ethical; it is the highest command of evolution.

The question is whether our spirits, by their integral power of choice, shall at once, to-day, enter the immortal life of truth, purity, and honor, which is indestructible. The ennobled soul creates its own environments. By a growing power of memory, of love, of imagination, of synthesis, it summons about itself the beautiful and good. The chrysalis paints the wings of its future butterfly-life. It is the life-purpose of to-day that creates to-morrow. If our character be right, our future must evolve the grand, the beautiful, the useful, the abiding. The final religion is an evolution of capacity for beauty, thought, freedom, work. The ultimate object of worship is the trinity of Plato, "the true, beautiful, and good," as found in that self that is not only higher than ourselves, but is the self-that-ought-to-be. Incomparably, the question that evolution deals with is life, the eternal development of our lives in the All-Embracing Life—the one great Fact of the Universe. Its theme is the measureless unfolding of God; and its latest chapter is man, whose heredity is from God. Paul, as well as Aristotle and Plato, refused to teach unconditional immortality.

The true expression of moral aim is "the higher life"; not beatific rest, not completion, not heaven. Evolution, intrusting to us the work of all past ages, charges on us to add our increment to heredity, and to make our own lives sublime. We have not, by reaching any ethical conditions, escaped the law of the survival of the fittest. Our conception of a second stage of life is that of ignorance yet to surmount; moral weakness yet to master; mental power yet to accumulate; ideals to touch; the Divine

One to be seen in ever grander vision and ever sweeter trust.

This is my last lecture to you in this course. You are doubtless now precisely where the first living creature found itself—hungry. Whoever finds himself, finds himself at that point. It was the first function of life; it is the last. It was the beginning of evolution; it is the end of evolution. The foraminiferæ thrust out tentacular substance for food. They swallowed all that touched them. The amœba folded in any particle it found, and absorbed it. It could do no better with lime and sand that it swallowed than with them to make protective shells. These shells were the first conservatism, the first creeds. But no globigerinæ was ever fool enough to make a shell that it could neither enlarge nor get out of. Man only builds a shell which he fills, and then refuses to feed farther. Blessed are they that hunger! This is the beatitude of all existence. It underlies all growth, all joy, all progress. My hope is that I shall leave you exceedingly hungry, and that, having broken your silicious theories, you will wisely build anew on the principle of perpetual evolution.

THE END.

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